

THE IRON AGE

THURSDAY, FEBRUARY 6, 1890

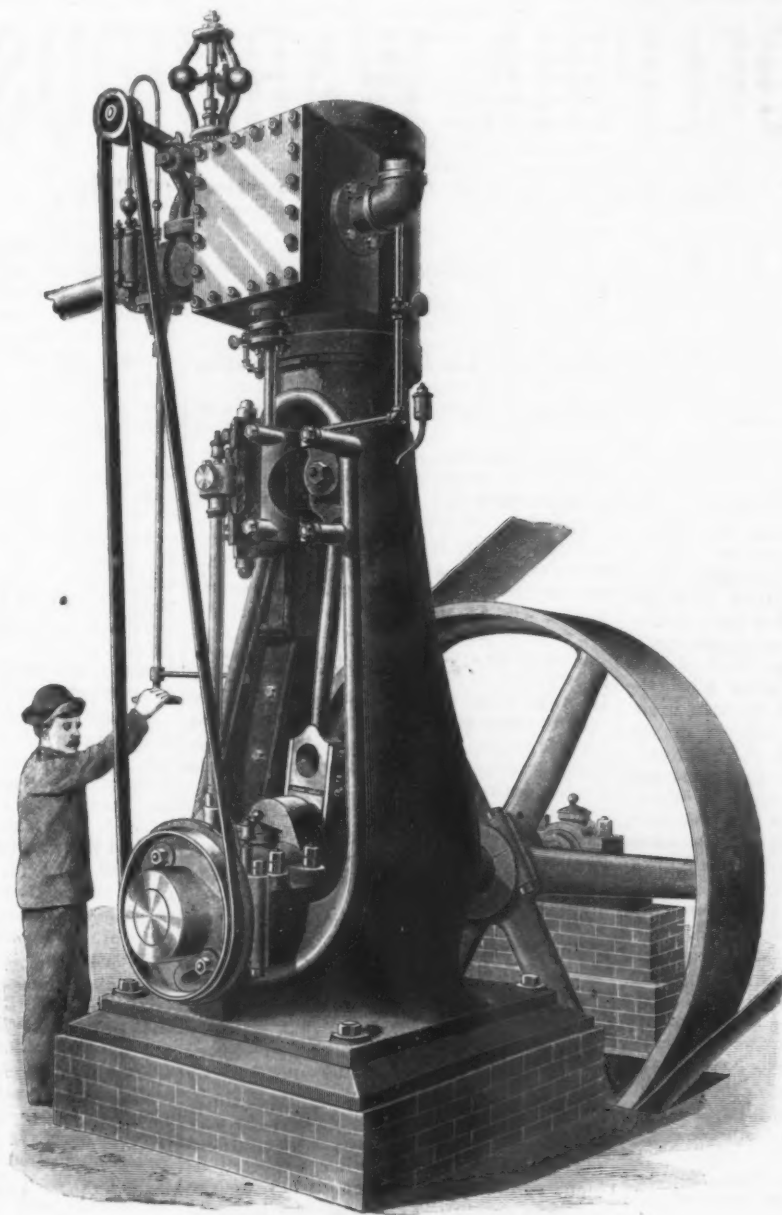
One Hundred Horse-Power Vertical Engine.

The accompanying illustration represents a 100 horse-power vertical engine built by the New York Safety Steam Power Company. This power is developed with 60 pounds initial steam pressure and 100 revolutions per minute, when cutting off at one-half stroke. Engines of this type are serviceable in all branches of manu-

valve is of the plain slide pattern and its stem is connected with the eccentric rod by means of a valve stem guide and pin, moving in a bracketed bearing of large area and babbitted; there being but one pin to the whole valve motion. The piston is hollow, firmly fitted to the rod, and packed with metallic rings. The crosshead is of ample strength and fitted with adjustable shoes for taking up the wear. The piston rod, valve rod, crosshead pin,

to do. Should any part of the engine become broken by accident or worn out by long usage, it can be replaced without loss of time and at slight expense, as all parts are made interchangeable and kept in stock ready for delivery.

The United Mine Workers' Convention met at Columbus, Ohio, adopted a constitution, elected officers, divided the coal field into districts and agreed upon scales



ONE HUNDRED HORSE-POWER VERTICAL ENGINE.

facture, and especially where economy of floor space is desirable. The system of distributing power in factories by means of an independent engine for each department or set of machines, rather than operate all from a central engine, is rapidly gaining in favor and the vertical engine is well adapted for this service.

These vertical engines are built self-contained, with double cranks and two crank shaft bearings cast in the frame, from 2 to 50 horse-power; and with single disc crank and outer pillow block, from 20 to 100 horse-power. The crosshead slides are cast on the column and bored out with the cylinder, so there can be no derangement of lines or unequal wear of parts. The

etc., are of steel and the crosshead and crank pin boxes, are babbitted. Drain cocks are fitted in both ends of the cylinder and in the steam chest, leading condensation into the base, where all drippings are accumulated, and thence carried away by pipe connection. Perfect lubrication of all working parts is provided by means of a set of nickel plated automatic oil-cups for the crosshead and crank pins eccentric, and valve stem guide pin; all cups on the engine being stationary and sight-feed. Vertical engines from 20 to 100 horse-power are fitted with adjustable eccentrics whereby the consumption of steam may be regulated in accordance with the amount of work the engine has

for the ensuing year, as follows: Hocking Valley, 80 cents; Western Pennsylvania, 90 cents; Indiana block coal, 95 cents; Indiana bituminous, 85 cents; Wilmington coal field, 90 cents; Streator, Ill., 90 cents; Lasalle, Ill., \$1; Spring Valley, Ill., \$1; Springfield, Ill., 71½; Stanton and Mt. Olive, Ill., 66½; Peoria district, 85; Moundsville, W. Va., 85; Flat Top, W. Va. (run of mine), 50; Monongahela River, 90; Kanawha River, 90; Pomeroy, twenty-second division, 57; Reynoldsville (low grade region, run of mine), 50. Price for work in veins under 4½ feet at same proportions as present prices. The price for the Wilmington coal field is fixed at 15 cents per ton, the scale to take effect May 1.

The Chicago Shipbuilding Company.

All the land purchases of the Chicago Shipbuilding Company are now upon record. The company is the owner of about 21 acres, extending from 100th street to 102d street, being bounded on the west by the Calumet River and on the east by the Calumet River Railway Company. The river frontage is about 1300 feet. This land was bought in three parcels, and the total cost, according to the records, is \$80,000. The location is a good one for the purpose. The railway on the east will deliver materials at the yard, while the river on the west is to be made navigable by the largest vessels. The Government is now widening the stream to 200 feet and is to make its depth 16 feet clear. The company has already let contracts for the docking of the river frontage, for the dredging out and the docking of three slips, for the necessary piles and for the erection of shops and offices. The contracts call for the completion of the work by next September. Two of the slips will measure 400 x 100 feet and the third will be 100 feet wide by 425 feet on one side and 500 on the other. The buildings will include a large shipyard shop running along the end of the slips, part of it a two-story structure measuring about 225 x 75 feet and part a one-story building covering 500 x 75 feet. There will also be a storehouse and office building 40 x 100 and several other smaller structures. Work on these buildings begins at once.

To complete the work now laid out, the cost of the ground included, will involve an outlay of about \$225,000. This money is furnished entirely by stockholders, the company proposing to issue no bonds. The capital stock of the company, which has all been paid in, is \$350,000. Thus the company will have about \$125,000 working capital in cash after their yard is completed. The stock is held principally in Cleveland, but about one-third of it is held by individuals connected with the Illinois Steel Company and by men interested in shipping. The officers of the company are: President, J. F. Pankhurst, of Cleveland, who is vice-president and general manager of the Globe Iron Works of that city; vice-president and treasurer, Luther Allen, of Cleveland, who is secretary and treasurer of the Globe Iron Works; manager, W. I. Babcock, late superintendent of the Union Dry Dock Company, of Buffalo. The directors are: J. F. Pankhurst, M. A. Hanna, H. M. Hanna and Luther Allen, of Cleveland, and W. I. Babcock, Robert Forsyth and William L. Brown, of Chicago. The company now have contracts to build for the Minnesota Steamship Company two steel steamships at a cost of \$210,000 each. About 300 men will be employed at first, but the plans of the company contemplate in the early future the addition of engine, machinery, boiler and forge shops to their plant, when a much larger force of men will be employed. It is probable also that one of the slips will be converted into a dry dock. When the yard is completed the company will be able to work on six ships at a time and to finish 12 a year, the work on each vessel lasting about six months.

The burning of a wrecked passenger train near Indianapolis a few days ago illustrates again the perils of the car stove. The flames spread from the overturned stove with great rapidity before several of the passengers, already maimed or dead, could be extricated.

Dr. Ranney's Blackwell's Island bridge scheme is revived in a new bill introduced into the Legislature of this State. The proposed New York terminus is near the Grand Central depot.

THE ELEVATED ROADS.

How They Are Taken Care Of.

Keeping in perfect condition bridges on which are 90 miles of track, over which pass daily each way trains carrying hundreds of thousands of people is certainly a task of vast magnitude. And yet so well has this work been performed since the inauguration of the first elevated road in New York City that the structure now in all its parts is in better condition than it was when first erected. The vast number of links, some 4000 spans, comprising this great chain necessitates, in order that there may be no weakest one, a conscientious, careful and thorough system of inspection, followed instantly by perfect repair. Exactly how this is done on the lines of the Manhattan Railway Company, the make-up of the department having this work in hand and description of the method of inspection and of repair, or in other words, the general care of all of the lines, is the purpose of the following article:

THE DEPARTMENTS.

In studying the *personnel* of the elevated system, we find one main consideration running through it from the highest official to the latest employee, all tending as a first consideration to the safety of passengers. All rules and instructions governing not only the Maintenance of Way, but also the Engineers' and Master-Mechanics' Departments, place this fact conspicuously and make it of paramount importance. Further than this, it is emphasized in the instructions given to the employees of all grades and is enforced by the chiefs of divisions and sub-departments, who are personally responsible for the causes leading to any injury.

The entire system is under the general supervision of the general manager, F. K. Hain, to whom all reports affecting in any way the structure or its mode of operation are referred and who is responsible through his assistants acting as chiefs of departments for the entire welfare of the whole road.

The chief engineer of the road, Robt. I. Sloane, and his assistant, John Waterhouse, have the general supervision of all the foundations, structure, by which is meant the columns and connecting girders, track, switches, signals, interlocking switch apparatus, pavements, sewers and sewer connections, and all buildings and real estate owned or leased by the company. It is his duty to cause the foundations to be vigilantly watched and protected against injury from any cause, such as broken water-mains, construction of drains or the building of vaults or foundations for buildings along the line of the road, which may in any way tend to endanger the safety of the foundations. He is further expected to look carefully to the condition of the columns and girders, testing the latter at frequent periods in a manner which we shall describe hereafter, and note the general condition in detail of the entire iron structure from the foundation to the track. His report is made in detail once a month and recounts the work and repairs done to the structure, track and buildings, with the cost of the same, and of course outlines in a very true manner the precise condition of each of the four roads from end to end.

THE ROADMASTER.

Robert Black, and his assistant, H. Harms, report to and receive instructions from the chief engineer. It is in this department that we find the most interesting subject matter, since it is here that the inspection as a practical piece of work is carried out and the necessary repairs made, and upon this department depends the

perfect condition of the structure and to the extreme vigilance and very perfect system which has been worked out during the life of the elevated roads is due the fact that no accident of a serious nature has ever resulted from a defect in the structure itself. We will briefly outline the make-up of this department before entering into a description of the execution of the work from inspection to completed repair.

The roadmaster has charge of the maintenance of all of the iron structure above ground and having appurtenances to it. This of course includes track, superstructure, switches, signals, &c.

An important point is brought out in this department which applies equally well to all others, and is what we might term the placing of the responsibility individually. That is, in case of serious defect the roadmaster is expected to make himself personally acquainted with its nature and to be familiar with the work necessary to its repair. He passes frequently over the structure on foot, and also inspects it from the ground, this being done first to note its condition, and second to note that the employees under his charge are faithfully carrying out the work. In this inspection he notes whether loose rivets or other fastenings have been promptly replaced, the report daily sent to his office keeping him informed as to their location, whether the switches and signals operate truly, and that every employee under his direction is doing his duty, and in order that he may do his duty is provided with the necessary tools and supplies. He notes particularly the condition of curves, with which, especially at the lower end, all the roads abound, and of those parts of the structure which are unusually high. He keeps in store all articles needed for emergencies, such as appliances used in the operation of the road, tools used in its repair, parts which may be needed, and proper wrecking outfits placed so as to be immediately made use of and distributed at such points as may be designated.

In case of accident or serious detention to trains, he or his assistants must proceed to the place, direct the disposition of the wrecking force and assist, as far as lies in his power, in removing the cause of trouble. He can, when required, call to his aid any employee in any other department of the road. His office is constantly open and is always tenanted by some one capable of representing the roadmaster in case of his absence. He receives reports daily covering all the work done as inspection during the day before, makes a tabulated record of the result and sees that proper provision is made for carrying out the repairs found necessary by the inspection and, finally, a copy of his report made up and covering the work of his assistants during the preceding day is sent to the chief engineer and also to the general manager.

SUPERVISORS.

Under the roadmaster are four supervisors, one in charge of each of the four roads, the Second, Third, Sixth and Ninth avenues. They are responsible for keeping the columns, girders, tracks, switches, &c., in proper condition, and when a case arises which needs urgent and prompt attention they are expected to attend to it personally. They must pass frequently over their divisions, noting defects, inspecting the most critical members of the structure, watch the pocket bearings of the girders, the I-beams track stringers in the pin-joint structure, the floor beams that they show no signs of distress, and especially note anything that may form an obstruction to the track. They have charge of the trackmen and repair men employed on their division, and they must take pains to fully acquaint their employees under them with the rules

and regulations of the company and the use and object of all signals, and to ascertain that each man performs well his full duty. They must attend personally to the removal of snow or obstructions from the track and particularly to guard against any accident that might arise to pedestrians from an article of any description falling from the track.

FOREMEN.

Under the supervisors are foremen who have charge of certain sections of the road, and who are in turn responsible personally for the condition of their section and for the men under them.

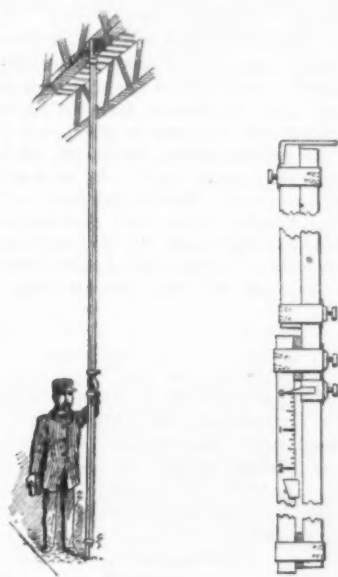
The foremen of inspection must examine the structure as a whole and note its condition in regard to all connections, rivets, track, switches, &c.

The foremen of structure repairs are also under the direction of the supervisors, and carry out the instructions received as far as repairing any defect found by the track-walkers. In addition to the general information possessed by the others, they must understand fully the track signals

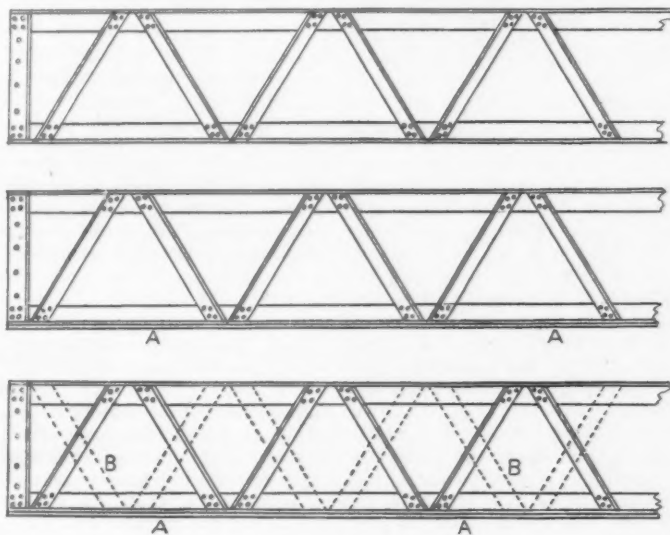
It used to be the custom in case of fog to notify all the trackman, rivetters, &c., and to place them on the road as signal men. By means of a very simple device, invented by the roadmaster, this has all been done away with. By means of this system a train always has a danger signal behind it. This danger signal is not set to safety until the train has passed another danger signal, which is then set to danger while the first one is released or set to safety. The apparatus is mechanical entirely, and depends for its operation upon the weight of the engine and cars which depress a toggle-joint arrangement placed at the outer side of the rail, the joint being raised a little above the rail. As the face of the wheel strikes this it is depressed and through suitable connecting-rods the proper signal at one point ahead is set to danger, while the signal last passed is set to safety. This does away entirely with the necessity for calling out the trackmen, and as the signals are placed close together, they answer every purpose. Working in connection with this system at

mer which gives a sure indication of false rivets, and in some cases, especially after a storm and when the defect may be of recent origin, a rust mark formed under the rivet and defacing the painted structure gives sure evidence that that rivet in question needs replacing. When a defect like this is found it is chalk-marked.

Each defect on the main lines is noted in the report by giving the numbers of the two columns between which that defect is found and the track, north or south, of the columns. By numbers the yard men are also enabled to point out the exact location of any defect they may find. Should the track man find a defect which he cannot remedy with the few light tools he carries with him, he telegraphs from the nearest station to his foreman, and if the case is urgent he also telegraphs to the roadmaster's office. The latter office is open 24 hours each day the year around. Upon receipt of this telegram the foreman of that section or his sub-foreman immediately goes to the place indicated, as does also some one



Testing Girders for Deflection.



Method of Reinforcing Girders.

NEW YORK'S ELEVATED RAILROADS.

and the times of trains, and when engaged in making repairs must be careful to keep the main track always open and safe for the passage of trains, in order that no undue delay or accident may arise. Before obstructing the track, when such is necessary, they must first conspicuously display a danger signal at least 300 feet in each direction from the obstructed point. The rule defining an obstruction is anything which interferes with the safe passage of a train.

The track-walkers must watch also the telegraph line and report promptly to the nearest Southern station agent of any derangement. They are required to carry with them light hand tools, flag signals, and to be prepared to rectify any irregularity discovered and which lies in their power. Any repair needing further machinery or assistance, and which in any sense endangers the structure or its operation, must be telegraphed to their foremen and also to the roadmaster's office.

The street-repair gang has charge of all repairs to foundations, sidewalks, sewers, pavements, excavations necessary for additional foundations and repairs to fenders at the foot of columns. The foremen of the street-repair gangs report and receive their instructions from the chief engineer.

some of the most critical points are torpedo attachments so placed that should an engineer fail to see a danger signal and pass by it, he is notified by the explosion of the torpedo placed on the rail.

THE YARDS.

which mean all places where there are more tracks than the two main ones or where there are many switches, as at Chatham Square, or where there is a signal tower, are provided with men who work in gangs the entire 24 hours. They examine and are responsible for the condition of the switch points, switch appurtenances, interlocking switches, frogs, rails and signals, and in addition are expected to note any defects they may find in the structure. They also hand in a report to the main office of the roadmaster at the Battery once a day, noting any defects they may find, the nature of the defect, and what we may term the degree of defect, that is, whether it should be repaired at once or whether it is in a fairly good condition or not.

INSPECTION.

As the entire structure from the Battery to Harlem on the four lines is a riveted bridge divided into hundreds of short spans, it is evident that a careful inspection of the riveted work is extremely essential. This is performed with a ham-

mer which gives a sure indication of false rivets, and in some cases, especially after a storm and when the defect may be of recent origin, a rust mark formed under the rivet and defacing the painted structure gives sure evidence that that rivet in question needs replacing. When a defect like this is found it is chalk-marked.

The report daily sent in is made out under the following heads, which, while they do not cover every member of the structure, still indicate the principal parts. Beyond this, the foreman making the report is compelled to add under other heads anything he may find needing attention. These heads, under a blank entitled "Track and Structure Defects," are as follows: Braces Broken, Expansion Bolts, Excavations, Fish Plates, Guard, rail, Girders, Pocket Bearings, Rails Rivets, Switches, Interlocking switches, Ties.

A further and exceedingly important work connected with the inspection of the road is the examination of all drip-pans, in order to see that they perform their duty thoroughly and effectively.

REPAIR.

The reports having been sent to the main office, it becomes necessary to quickly

make the necessary repairs or changes. In the case of loose rivets, a gang of riveters, provided with a sheet showing the defective rivets, as pointed out in the report,

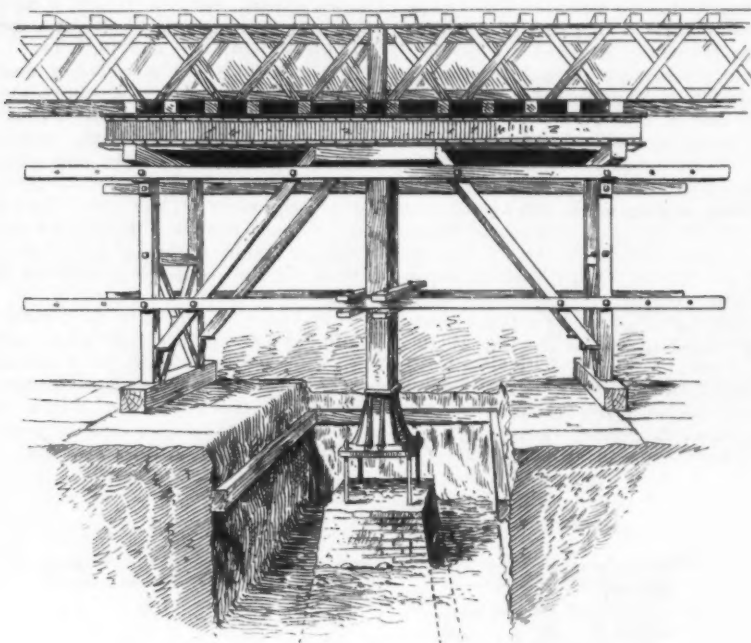
sists of two sticks sliding upon each other, is raised one end upon the road midway between the columns and the hook at the upper end passed over the bottom chord of

known, all the factors of the problem to calculate the strength of that girder are at hand. In this way the entire road is tested for deflection once every two months. The report of the deflection tests embraces the following points: Number of the column, location, number of the engine, depth of girder, length of girder, dimensions of angles, deflection, track (north or south), date, line, kind of girder (lattice or plate).

The first girders built were single lattice. As the loads increased of course the deflection became greater, and it became important to reinforce or strengthen the girders in order that there might be no risk in regard to strength. This is done in a very simple way, of which we present drawings. The upper drawing shows one style of girder as originally built. This is reinforced by the addition of a plate A riveted to the bottom of the lower chord, as shown in the middle drawing. The lower drawing shows the next step, the double latticing of the girder by plates B riveted to the vertical webs of the angles forming the chords. Plate girders have been reinforced by a plate on the bottom chord and by diagonal braces extending from the upper corner to the bottom chord.

TRESTLING UP THE STRUCTURE.

Four instances, showing clearly four separate methods of trestling up the elevated road in case the foundations of the columns are at all endangered, are shown in the accompanying drawings, which are taken from actual work. In each of these cases, as in all others which have occurred in the history of the road, the necessity of deepening the piers of the columns has been caused by outside interference. In all the cases we here illustrate the inter-



Supported Structure on the Bowery.

and which, as stated, have all been chalk marked, is sent to remove all such rivets and to insert new. While engaged in this work they are also expected to act as inspectors and to examine the work and correct it with speed, if it comes within their power. In some places in the riveted work, as originally built, the holes were not reamed. When the riveters come across such a case they must ream that hole so that the new rivet they put in will surely fill it. All new work, of no matter what nature, is painted as soon after it is put in as possible. Worn-out rails, ties, bolts, parts of switches and signaling apparatus are also renewed as soon as practicable.

At each and every yard is placed a more or less complete wrecking outfit, consisting of timber, rope, jacks, &c., and when occasion requires a working gang is called immediately together, an outfit obtained from the nearest yard and, if deemed essential, the structure trestled up.

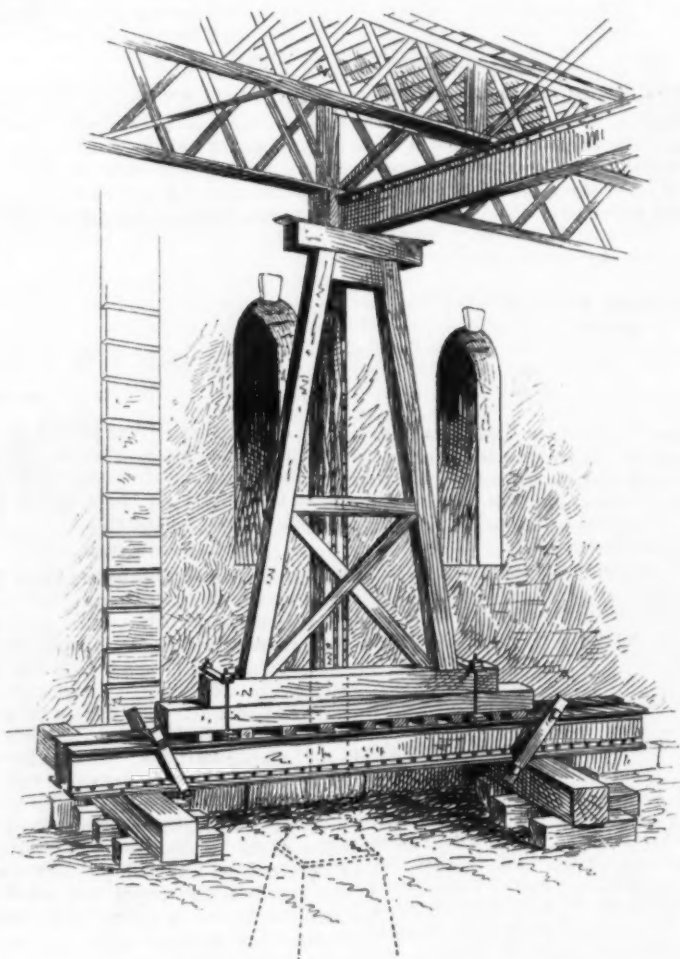
During work by any of the gangs handling small tools a large canvas apron is suspended beneath the track in order to catch any material or tool that may drop, and to further insure the secure handling of both tools and materials they are placed in boxes.

DEFLECTION OF GIRDERS.

Once a month the girders in one-half of the structure are inspected for deflection, in order to find out if they are still bearing the load as they should, or if they have weakened so that they bend more than the limit determined upon. This limit is $\frac{1}{16}$ of the length of the span. For instance, a span of 60 feet would have to be reinforced if the deflection noted was $\frac{1}{4}$ inch. In order to prevent misunderstanding in regard to this part of the work, it may be well to state that in no single instance has it ever been found necessary to reinforce a girder from deterioration or false construction in the girder itself. The greater load brought on the girders by the increased weight of the rolling stock has mainly and almost solely been the cause of this.

The method of ascertaining the deflection is illustrated in the accompanying drawing, and is extremely simple. A rod which answers every purpose of the leveling rod of the surveyor, and which con-

sists of two sticks sliding upon each other, is raised one end upon the road midway between the columns and the hook at the upper end passed over the bottom chord of



Supported Structure on Pearl Street.

the distance which one rod slides upon the other. The number of the engine at the same time is taken, and as its weight is known, and as the length, depth and dimensions of the members of the girder are

ference has been caused by deepening the excavations for buildings immediately adjoining the piers, but, as we have explained before, interference producing like results may and has frequently been occa-

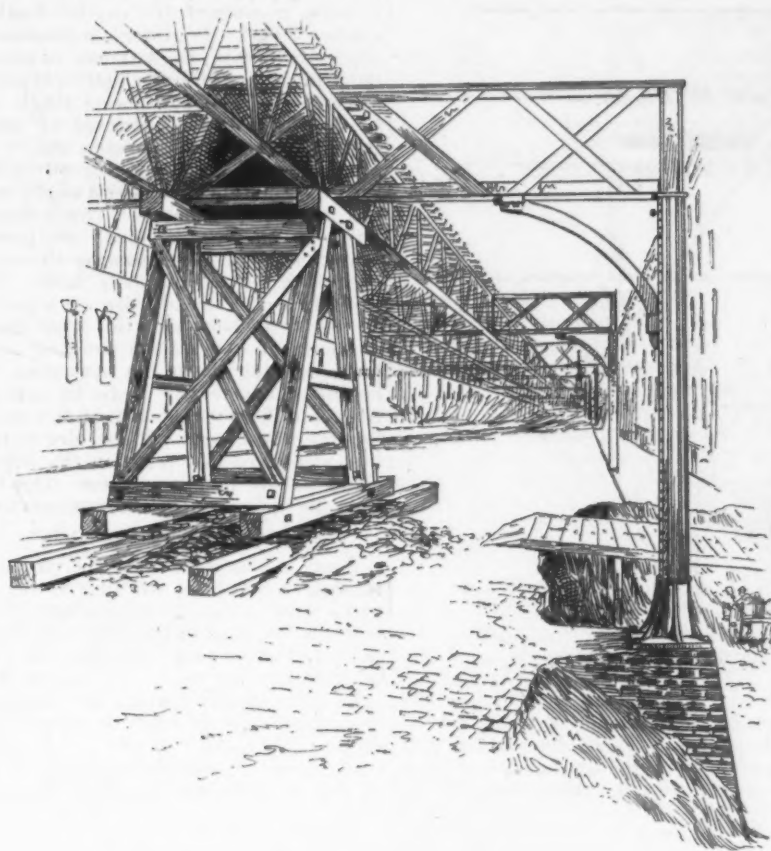
sioned by sewer-work in the street, sewer connections, subway excavations or undertakings of similar character which disturb the ground in the immediate neighborhood of the pier, and in several in-

structure, that the several members of the framing are so proportioned that they may be used on roads where the height from the street to the bottom chord of the girder does not vary more than a few feet, and

building to carry the column foundation down much lower than originally placed. The road here consists of columns placed about on the curb line each side of the street, which are connected at their top by cross beams, on which are placed the through or longitudinal girders carrying the track. In this case in order to support the structure it was only necessary to place a framing under the one transverse beam resting upon that particular column. This frame is similar in many respects to that shown in the cut described, although its arrangement as far as the track is concerned is decidedly different. This frame is also so arranged that it can support roads of several heights, although of course being single it is useless when it is necessary to span an opening.

The next case, on Fifty-third street, the road is built in accordance with the same principle as that followed at Pearl street, except that the transverse beams are longer and the tracks are placed nearer the center of the street and consequently further from the columns. Owing to the nature of the excavation, it here became essential to support not only the transverse beam carrying the longitudinal girders, but also the girders themselves, and for that reason the false work was placed in the center of the street, so that it might support and have a good foundation for the entire structure.

It will be understood from the foregoing and from what we have said previously in regard to the wrecking outfits kept in each yard of the road that it is possible at any time and at short notice to support any part of the structure should such action be occasioned by endangering any of the foundations. A feature comes in here which it is well to slightly dwell upon, and that is the fact that the elevated road in no instance depends upon outside support. When the officials find that an adjoining excavation is going down below the foundation they have already built for their columns, the road is supported and that foundation is extended at least 2 or 3 feet below the proposed excavation interfering with them. In all cases of this character it is further a practice to carry



Supported Structure on Fifty-Third Street.

stances went below the lowest point of the foundation. In no instance has it been necessary to temporarily support the girder portion of the structure by means of bracing and repair the foundations due to defects in the original work. For this reason we have styled such cases "outside interference."

The drawings, while showing distinct methods of supporting the superstructure, at the same time give four different types of road. It will be observed that the arrangement of the columns, longitudinal and transverse girders in the drawings vary one from the other, and, taken as a whole, give a good idea of the type of structure employed, leaving out, of course, the well-known plate girder system which is in vogue over a large section of the Sixth avenue road.

In the first drawing, which was lately taken on the Bowery, near Prince street, it became necessary to lower the pier foundation and of course in the meantime support the girders, which in this case are longitudinal and supported on single columns. On each side of the column was placed an A-frame, braced as shown in the drawing, which at their top supported two I-beams upon which rested the adjoining ends of the two girders meeting on the columns, their bottom ends resting partly on the sidewalk and partly in the roadway. Spreading of the lower end was prevented by tie-pieces united to the A-frames by bolts, and to the column by a strap arrangement of timbers and bolts, the service of the latter being to prevent buckling. Once in place, this false work carried the entire weight formerly supported by that column and permitted the removal of all earth beneath the foundation and the subsequent lowering of the foundation to a point below the interference. It will be further noticed in this, as in the other cases of temporarily supporting the

where they may be called upon to span openings varying in width. For instance, the framing here shown could equally well be used for a road not quite so high from the street as the case shown, and by



Supported Structure on Church Street.

placing the A-frames further apart it could be made to span a wider excavation.

In the next case, that on the Pearl street line, near Fulton, it became necessary owing to vault excavations for a new

the foundation down immediately the intentions of those making the excavations are known, and to place no reliance upon statements made in regard to depths at which it is proposed to carry the outside

excavation, but to wait and see and when the excavation has been completed and the building or other structure erected, then the final work of carrying down the pier foundation is carried to completion.

One of the most difficult jobs the elevated road has lately had to perform was at the corner of Barclay and Church streets, where recently an old building was torn down and the excavation for the new one carried some distance below the original point. One column of the elevated road was or might have been endangered by this excavation, as sand somewhat in the nature of quicksand was encountered during the digging. It then became necessary to support that column, and as no reliance, on account of the excavation itself and the nature of the material encountered, could be placed on the sidewalk or roadway immediately adjoining that curb line, a crib foundation was built consisting of three rows of ties placed crosswise, as shown in the cut. In order not to interfere with the builder, who was not particularly friendly to such operations, the trestling up of the road was performed one Sunday when all work on the building had ceased. The excavation at the bottom was then leveled off, the cribwork built up, a frame placed on this, as shown, and under the track extending across to the column on the opposite side of the street were placed two deep I-beams, which rested upon false columns on the opposite side of the street; also by uprights on the endangered side of the street and also by the A-frame, which rested on the curbwork. To further relieve the column on the near curbstone, inclined struts or braces were placed, extending from the bottom of the A-frame resting on the cribwork up to and supporting the I-beams, where they met the endangered column. The spreading of the A-frame away from the elevated structure was prevented by a beam placed against its base and supported by the wall of the adjoining building. This case was somewhat out of the usual run, owing to the peculiar conditions arising, yet it shows admirably the resources kept constantly on hand for cases of just this description, since all of the material entering into the false work supporting the structure came from the main supply yard of the company and was put in place without any cutting or fitting.

TESTING THE IRON.

When the Greenwich street line, or the first one built comprising the present system of the Manhattan Railway Company, was thrown open to traffic, there was much discussion in the daily and technical press concerning the probable durability of a wrought-iron elevated railroad of this kind. Among some of the points brought out to show beforehand that the road would not be a permanent institution and that it would certainly within a few years need not only extensive repair but probably complete renewal, were the statements that the salt atmosphere in New York would have the effect of rapidly rusting all the parts, especially at the connections; that there was great danger of deterioration of the strength of the iron due to crystallization, and that the limit of the strength of the girders would soon be approached owing to their inherent decay. This, as stated in the opening paragraph, has been shown to be false in every respect, since the road now is actually stronger than when finished.

Five years ago an examination of the elevated structures on the four avenues was made by the following engineers to ascertain their safety: A. P. Boller, Birdsall Cornell, Joseph M. Wilson, Thomas C. Clarke, Adolphus Bonzano, A. R. Whitney and Walter Katté. These names will be recognized as comprising some of the most prominent engineers and bridge constructors in the country, and

the opinion they then brought out is therefore of vast weight. They found that so far as any question of the deterioration of material is concerned through crystallization no fear need be entertained. After careful examination they stated that the strength of the various structures and the safety of their joint connections or riveting were found to be in accordance with conclusions made by the engineer of the road. They found upon inspection that the structures themselves were safe for existing loads, and they saw no occasion for any anxiety on the part of the public as to the safety of the roads "in view of the very thorough inspection continuously maintained over them through which any defects are at once made manifest long before they could possibly assume dangerous proportions. This inspection has been so long continued and so thoroughly performed that we are satisfied that the structures are in a better condition to-day than ever before." In regard to the high columns where rivets had broken off in cold weather, it was explained that this resulted probably from the contraction of the exterior iron casing assisted perhaps by the freezing of accumulated water between the concrete with which the columns were filled and the iron, but as the occasional bursting of these rivets in no way endangered the structure, the surplus strength of the columns being very large, there was no cause for anxiety.

At the same time tests of specimens of some of the members of the structure which had been subjected for six years to the most severe duty were made by Prof. R. H. Thurston, to determine the exact condition of the metal. These tests showed the iron to be of good quality, and especially excellent in regard to ductility. No sign of crystallization could be detected, and in fact the samples operated upon showed less crystalline structure than does the average or commercial iron such as customarily found in similar structures. Their strength, ductility and shock-resisting power were such as to prove conclusively in the professor's opinion that no deterioration could have occurred since they were put in place. We may state in parenthesis that the maximum tensile load on any member is limited to 9000 pounds, while the maximum load of compression is limited to 8000 pounds to the square inch.

The tested pieces showed remarkable uniformity in tensile strength, the average being about 50,000 pounds. Their ductility was close upon 20 per cent. elongation in a length of 6 inches. The reduction of area was about 40 per cent.; the elastic limits ran usually from 20,000 to 26,000, averaging about 25,000. Bending tests showed in all cases a fine fibrous iron.

We find much interesting matter in the report regarding the question as to whether there are present any causes which may lead to the ultimate destruction of the iron bridge members, and also the question whether the long-continued vibrations and repeated shocks produced by the almost uninterrupted action of the constantly-passing trains may not lead to gradual destruction of strength and elasticity. In this case it was found, as also in the report of the engineers, that there was no evidence whatever to give the slightest foundation for the belief that wrought iron loaded within the elastic limit would ever yield either to stationary or intermittent unreversed loads, or that crystallization would ever take place under such conditions. The experiments have shown that when repeatedly loaded with one-half their breaking weight, as determined by tests, members will finally break under greater weight after several deflections, but when loaded with one-third the test load the same girder will bear indefinite repetitions of the load and remain uninjured. It would thus seem that a load of

one-third the ascertained maximum is safe for iron girders.

In regard to the probable tendency of simple age and exposure, the atmospheric influences tending to reduce the strength of such a structure, there is no need for alarm, as shown by experiments and by facts brought out in bridges, which have been examined after service of years. It seems probable that iron improves with age as a rule, and invariably, unless it is exposed to corrosion. The surfaces of the pieces of iron taken from the elevated roads showed not the slightest indication of corrosion during their years of exposure, and the paint with which they had been covered had been of such excellent quality and had been so carefully applied and renewed as to perfectly preserve the surface as if it had been hermetically sealed.

The report concludes with the expression that the elevated railroads were originally designed and proportioned in such a manner as to be perfectly safe. That they are not liable to the class of injuries suggested as possible causes of a limited life, that they are as safe practically against serious accidents or general decay as they were when first erected, and that they have not been subjected to overstrain by excessive loading, and that they are not liable to any other form of deterioration of quality of material known to the engineer.

It is fair to presume, when we take into consideration the first design of the structure, the quality of material and workmanship then employed, the small comparative load to which any member is subjected, and the exceeding refinement of the method of repair and inspection continually exercised, that the elevated railroads are to-day decidedly in a better condition than when first erected.

Milwaukee's Iron Ore Interests.

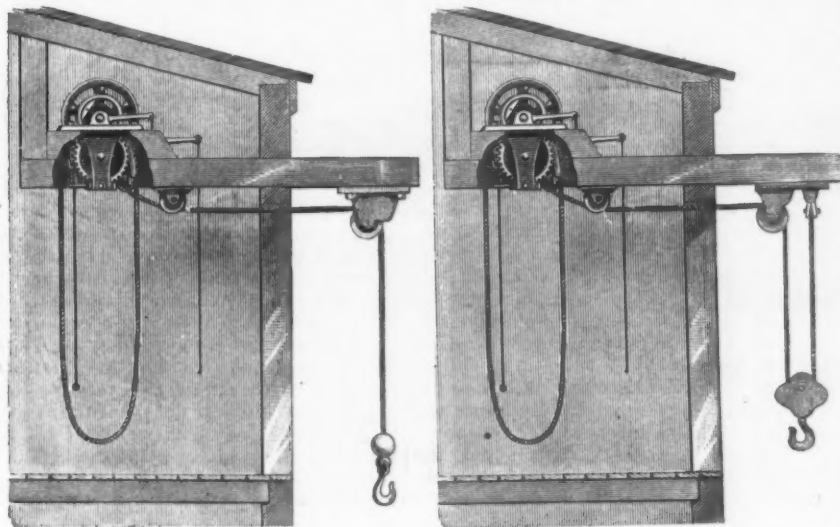
The Milwaukee people claim pre-eminence in ownership of Lake Superior iron ore mines. A Milwaukee paper says it is the opinion of most mining men that Milwaukee has distanced Cleveland in the control of iron ore properties. Most of the mines of the Marquette range, which is the oldest of the Lake Superior iron districts, still have their main offices in Cleveland; but, on the other hand, most of the mines of the Gogebic and Menominee ranges are controlled in Milwaukee. The Schlesinger syndicate, which control six of the largest mines and the bulk of the output of the Menominee district, as well as a number of promising properties of the Marquette district, have their headquarters in Milwaukee. The Metropolitan Land and Iron Company, who control the Norrie and Pabst mines, and have just appropriated a fortune to pay dividends, are quartered in the Cream City. The Wisconsin Central syndicate, whose list of mines includes the Colby, Ashland, Aurora, Palms and Superior, in the Gogebic district, also have their offices in Milwaukee. These are the three iron ore combinations of the country.

The estimated output for the present year of the Lake Superior iron mines whose management has its source in Milwaukee is in the neighborhood of 4,500,000 tons, being at least half of the entire product of the Lake Superior mines this year, and equaling the entire annual output of the Lake Superior mines some three or four years ago. Of the three Milwaukee syndicates which will ship this year 4,500,000 tons of ore in the aggregate the Schlesinger mines will undoubtedly take the lead with 2,000,000 tons; the Colby people will follow with about 1,500,000 tons, and the Metropolitan Company will send out something like 1,000,000 tons. Several minor companies will help to swell the total.

Outrigger Hoisting Machine.

In this issue we present illustrations of a hand-power outrigger-hoisting machine made by the Energy Mfg. Company, 1115 South Fifteenth street, Philadelphia, Pa. The cuts represent the 500 and 1000 pounds machine as now made. These hoists use 1-inch rope for both hand and load. The manufacturers state that since placing

stocks on hand in December was only 26,000, which proves that if the steel mills had been running during the month of December, as in September, October and November, and as they are now running in this month stocks would actually have decreased 6000 tons. We expect that the January report will show a decrease in stocks, and believe that the consumption is fully equal to the output of the blast



HAND-POWER OUTRIGGER HOISTING MACHINE.

these hoists on the market they have made a number of improvements which are embodied in the present machine. The hand-rope wheel-shaft can be lengthened so that the hand rope will come on one side of the doorway. They are geared as shown, possess considerable power, are easy to work and have an ample automatic brake which sustains the load at any point. The operator can let go hand rope at any time and load cannot lower except the brake-rope is pulled, and as the load-rope does not wind around a drum it is always in line with wheel on end of beam. The wheels are large so that ropes have easy bends. The machines are proportioned so as to be in every part stronger than the rope; if an accident occurs in use it will be by a breakage in rope and not the machine.

The Western Iron Trade.

We have received the following letter from a prominent Western iron manufacturer whose standing in the trade is so high that his opinions are worthy of being received with the utmost consideration:

There is no question but what raw materials have weakened somewhat during the past month. This, in our opinion, is largely owing to the increased stocks of pig metal on hand in December. But this is very easily accounted for. December is the month during which the steel mills usually stop for repairs and to make contracts with their men for another year. Their contracts expire January 1 each year with their labor. The increase in stocks was all in the Pittsburgh and Illinois districts. In the Pittsburgh district all of the Carnegie mills were idle during the month of December making repairs, and they piled up about 20,000 tons of pig iron. In Illinois there was a large increase—we think about 11,000. We understand that some of the Illinois Steel Company's mills were idle during the month of December or the greater part of the month. Had all these mills been running in December, they would have used up about 32,000 tons, while the increase in

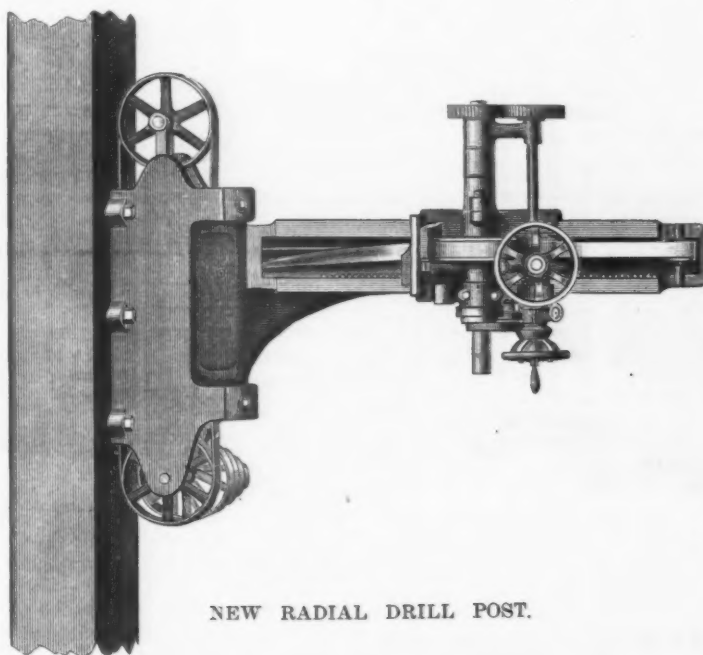
furnaces now in blast throughout the country. We have gone carefully over these figures and believe that January will show a decrease in stocks on hand, which will increase the price of pig iron, after the report is out, say about the middle of February. The "grippe" has caused more trouble than people generally have

Radial Drill Post.

A great variety of post and suspension drills are in daily use in boiler shops, bridge works and foundries, where it is desirable to have the work remain on the floor or truck, but one detrimental point with all the fixed machines lies in being compelled to move a heavy piece for every hole, and the time and labor to adjust it exactly to the point of drill soon compels the manufacturer to look for a more suitable tool—one by means of which the operator can do all this work with ease, and where only the drill, which works freely in either direction, has to be moved, and where the work, having been once turned up, can remain until finished. The machine here illustrated is in design and construction the counterpart of the regular patent radial drills built by Alfred Box & Co., of Philadelphia, and which have been in use for a long time. For long work any number of these machines can be connected in gangs to one shaft running through each machine, such as used in modern bridge construction.

A new natural gas line is contemplated to extend from Washington County to Allegheny City, to supply the mills of Lindsay & McCutcheon, Smith Bros. & Co., Oliver Iron and Steel Company and other manufactories. The mills and factories that depended on gas for puddling iron and steel have had to close down that part of their works on account of the scarcity of gas. The alternative of going back to coal or looking out for a new field from which to draw gas presented itself. The manufacturers promptly adopted the latter course.

It has been claimed that the Diamond Plate Glass Works, at Kokomo, Ind., were entitled to the credit of turning out the largest sheet of plate glass ever cast. It was 122 x 202 inches, but Mr. Edward



NEW RADIAL DRILL POST.

any idea of. At times 25 per cent. of our men have been sick, and there has not been a day within the past month that we have not had a mill and sometimes two off on that account.

The first regular annual meeting of the stockholders of the Illinois Steel Company for the election of directors, &c., will be held at the offices of the company in the Rookery building, Chicago, on the 13th inst.

Petit, New York agent of several French plate glass companies, declares this claim to be incorrect, and sends the following list of plate glass sheets exhibited last year at the Paris Exhibition by the St. Gobain Company: One rough plate, 319 x 163 inches, equals 361 square feet 13 inches; one polished plate, silvering quality, 301 x 162 inches, equals 338 square feet 90 inches; one polished plate, 320 x 166 inches, equals 368 square feet 128 inches. This shows that the French are still ahead,

but the plate glass industry is making such strides in this country, and more particularly in Pittsburgh and vicinity, that foreign competition, both in quality and size of sheets, will soon be reduced to a minimum.

Apparatus for Making Car Axles.

The method of constructing car axles here described is extremely simple. A blank of suitable length and of a diameter

and shaped as shown in the sectional drawings Figs. 3 and 4. The wedges are provided with tongues *e*, engaging grooves formed in the casting parallel with the faces of the jaws and the sections forming each wedge are connected together in order to insure simultaneous lateral movements of both sections by means of tongues *d* and grooves. The grooves are made somewhat wider than the tongues and are so located with reference to the jaws as to prevent the lateral thrust

of this cylinder are placed the others *d*, the piston-rods of which extend through passages in opposite sides of the casting to the cross-head *H*, to which the plunger *f* is attached. The two side cylinders are so proportioned that their power equals that exerted by the center one, so that when they are operating on a blank through the medium of the plungers the power of the two side cylinders will counterbalance the other. The pipes from each cylinder are connected to common supply-pipes

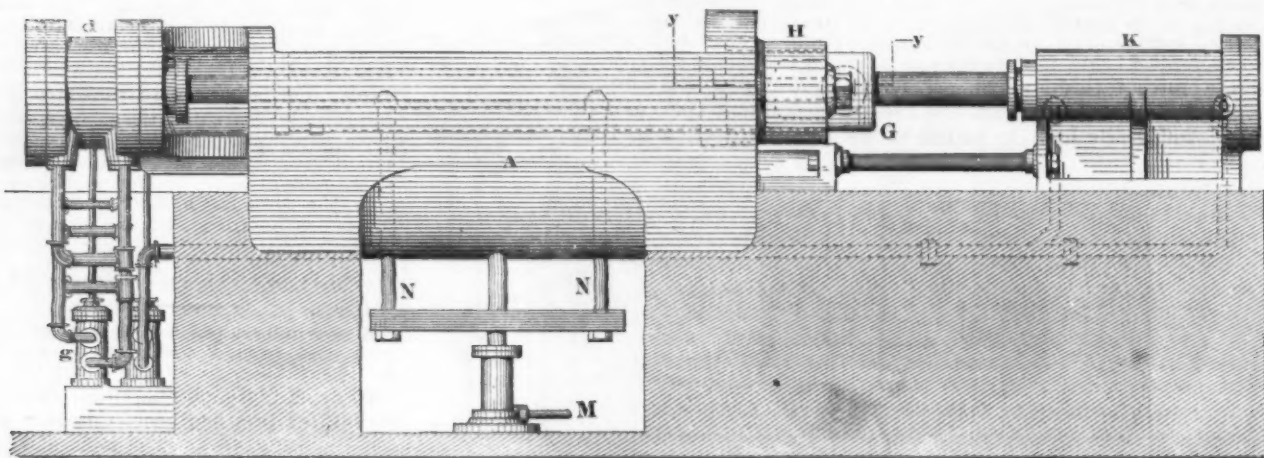
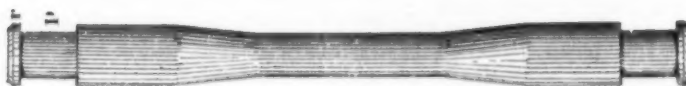


Fig. 1.—Side Elevation.



The Blank.



The Finished Axle.

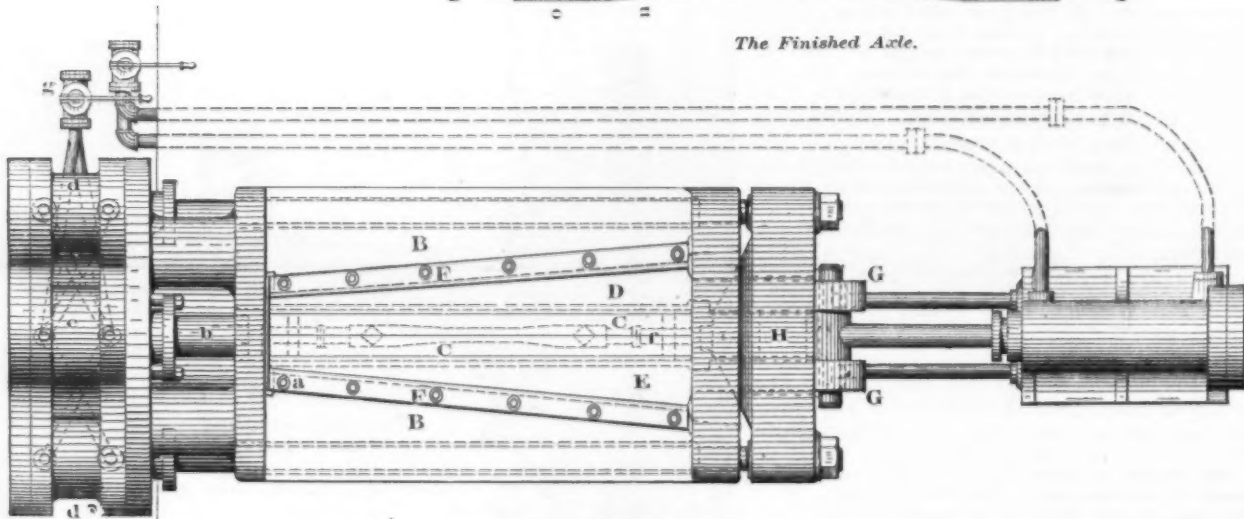


Fig. 2.—Top Plan View.

APPARATUS FOR MAKING CAR AXLES.

approximately equal to the diameter of the axle to be produced at its smallest part is placed in a mold and pressure applied at its ends. The blank is thus reduced in length and some portions of it enlarged to form the finished axle.

In the upper side of the casting *A* is a longitudinal recess, forming jaws *B*, which have their inner faces inclined toward each other from end to end. Between the jaws are placed dies *C*, having their faces recessed to form a matrix corresponding as to shape and dimensions with the axle to be formed. The dies are moved toward and from each other by sectional wedges *D E*, arranged between the dies and jaws,

of the wedges being taken up by the tongues rather than the jaws. The wedges are held in position against vertical movement by the plates *F*. Each wedge is provided at one end with a shank, *G*, extending through a cross-head, *H*, and connected by a pin to the piston-rod of the fluid pressure cylinder *K*. The dies are provided in their meeting faces at the ends of the matrices proper with circular grooves for the reception of the excess of length at each end of the blank, and also to permit of the movement of the plungers *a f* in the upsetting operation. The plunger *a* is secured to the piston *b* of the fluid pressure cylinder *c*. On opposite sides

leading to the valve mechanism *g*. The blank exceeds the length of the desired axle by an amount sufficient to supply the metal necessary for the required enlargements *n o p r* of the completed axle. After being properly heated the blank is placed between the dies, which are then closed by the wedges actuated by the cylinder *K*. The blank having been firmly grasped by the dies, fluid-pressure is admitted to the cylinders *c* and *d*, thereby forcing the plungers inward, upsetting the ends of the blank and causing portions to expand outward and fill the matrix of the dies. The plungers are then retracted, the dies opened by moving the

wedges outwardly in a longitudinal direction, the completed axle removed and another blank inserted. In order to facilitate the removal of the axle and the placing of a blank in position between the dies, a fluid-pressure cylinder M is arranged beneath the casting and on the cross-head carried by the piston-rod of the cylinder, bars N are secured. These bars pass up through openings in the casting.

On the upper ends of the rods are placed crutches, consisting of a shank or stem and a concave head. The shank and head are constructed so as to have the one a firm bearing on the bottom of the recess in the casting and the other on the bottom of a recess formed in the dies for the reception of the crutches when lowered. By means of these crutches the finished axle can be raised sufficiently high to permit of its

The Muller Basic Patent.

We print below the text of a patent granted to A. Muller, dated March 12, 1869, for the manufacture of magnesia linings for Bessemer converters and Siemens-Martin furnaces.

It is strange that this patent has attracted so little attention, for in it we find for the first time a thoroughly well defined practical process of dephosphorizing by means of basic linings and basic additions. Attempts at dephosphorization had been made and basic additions other than iron ore had been proposed, but the linings remained siliceous.

A. Muller was a manufacturer of ornamental terra-cotta and fire-brick in one of the suburbs of Paris. His business brought

basic additions fail to reap where he had sown. He was ten years too early, and it is quite as bad as being ten years too late.

The following is a translation of the patent:

"This invention has for its object the novel use in processes for pig iron refining (known as Bessemer or Martin process) of magnesian refractory products which cause diverse modifications in the reactions transforming pig iron into iron and steel.

"The result which I propose to obtain is to more completely rid the product of the sulphur and above all of the phosphorus contained in the pig, and moreover in the Martin process, to prevent the rapid destruction of the furnace by the oxide of iron likely to be used.

"Instead of making the inside lining of these apparatus of ordinary refractory products—namely, of silicate of alumina, containing or not containing a greater or less quantity of free silica—I construct these of pure magnesia, or at least of magnesia containing but small quantities of foreign bodies.

"The result is that the silica of the slag will come solely from the silicon of the pig, and consequently it will be in limited non-renewable quantity. The result is, therefore: 1. That the slag will be basic; for even though the oxidized metals form acid slag, the magnesian lining of the apparatus will always bring it back to the basic state by its own partial destruction. 2. That the phosphorus will pass to the state of phosphate into the basic slag and will thus be eliminated; while, if formed at all, it is always decomposed by acid slags. 3. That the elimination of sulphur, which is complete only when the pig iron contains but little, will be facilitated in very sulphurous pigs, either by direct oxidation, by means of basic silicates, melted oxides, &c., which can take place only in the presence of a basic lining, or by a greater proportion of manganese, an even weight of which forming a less abundant slag; or, again, by the formation of an alkaline sulphide with the magnesia of the lining."

The following is an "additional certificate" to the above patent, which was filed March 17, 1869.

"This 'addition' bears upon one of the very advantageous consequences of magnesia used as a lining; it allows the adding into the apparatus of certain bodies capable of maintaining basic slags by being dissolved as the lining itself would be, such as, for instance, quicklime, magnesia in lump or powder, &c.

"By this means the magnesian lining would last a longer time, as it would be attacked mechanically only, so to speak.

"By this 'addition' (to the original specification) I mean to patent not the use already proposed of certain oxidizing bodies capable also of giving a basic slag, such as nitrate of potash, nitrate of soda, &c., but to render possible the use of these bodies by the fact of the magnesian lining.

"In an ordinary siliceous lining the alkalis resulting from the decomposition of these bodies are always saturated by the relatively considerable proportion of silica in the lining, so that while the oxidizing action is produced rapid destruction of the inside takes place as well.

"With a magnesian lining, on the contrary, the oxidizing action will take place just as well, but the alkalis will contribute to render the slag basic without destruction of the lining.

The annual meeting of the American Institute of Mining Engineers will be held at Washington from the 18th to the 22d of this month. One Friday session will be given over to the discussion of papers on the manufacture, properties and uses of aluminum.

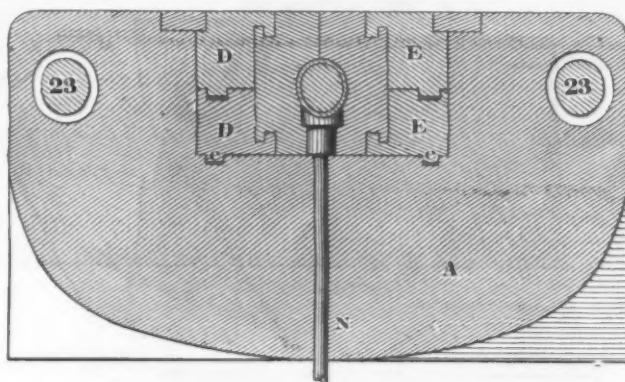


Fig. 3.—Sectional View Showing Dies Closed.

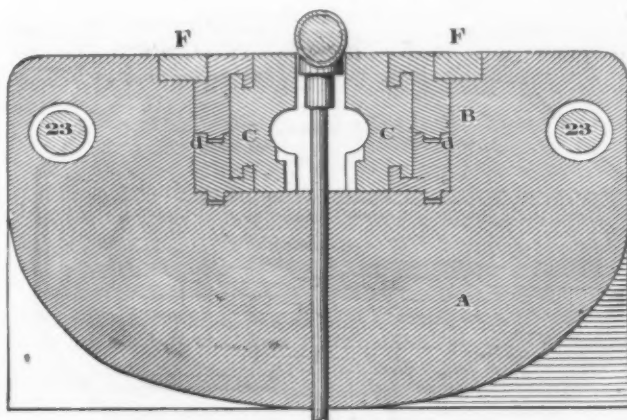


Fig. 4.—Sectional View Showing Dies Open.

being rolled or pushed to one side. A blank is then placed on the crutches and lowered into position for being grasped by the dies.

This machine is the invention of Henry Aiken, of Pittsburgh, Pa. The axles made in testing this method have proved very satisfactory.

The Canadian Pacific Railway Company makes a report of earnings for the year 1889 surprisingly favorable. The gross earnings were \$15,016,656, an increase of \$1,821,121 as compared with last year, and net \$6,006,057, an increase of \$2,135,281. The evidence is strong that the Interstate Commerce law has been much in their favor, the American lines being under restrictions from which their Canadian rival is free.

The contract for building the addition to the New York Museum of Natural History was awarded to J. B. Smith for \$353,000.

him in contact with metallurgists, and impressed by Grüner's remarks on the necessity of a basic slag in the purification of iron, worked out the method he patented. In 1868 he manufactured magnesia bricks, some of which are still in existence and intact. He proved the possibility of dephosphorization in a practical furnace and called the attention of steel manufacturers to his results; but he was too early in the field, for at that time metallurgists thought that purification was impossible at the temperatures obtaining in the Bessemer and open-hearth operations. Besides, Muller was not considered a metallurgist and his proposition never received the attention it was entitled to. The Franco-German war prevented all further efforts for a considerable period, and disgusted with the indifference of those who should have been most interested, he abandoned his patent by non-payment of the yearly tax.

Thus did the man who first promulgated a practical method of dephosphorization by the use of basic linings and

On the Most Economical Engine, for Small Power.*

BY PROF. J. E. DENTON.

A certain machine shop possesses two steam engines, one a plain slide-valve throttling 5½-inch bore by 7-inch stroke, the other an automatic cut-off, 7-inch bore by 14-inch stroke, both non-condensing. The shop required 7 horse-power to run it, exclusive of the power to overcome the friction of the engine. The question arose whether it was cheaper to run the shop at 70 pounds boiler pressure with the plain slide-valve engine cutting off at three quarters, or with the 7-inch by 14-inch engine cutting off at one-fifth under the automatic action of its governor, or whether fuel would be saved by operating the engines on the compound principle, using the small engine as the high-pressure cylinder and exhausting from it into the larger engine through a receiver, the system still being non-condensing. Both engines were carefully overhauled and made perfectly tight at their valve seats and pistons. Each engine was then tested to determine the power absorbed to run itself, with the result that the small engine consumed $\frac{1}{10}$ horse-power and the large engine $2\frac{1}{4}$ horse-power. The small engine was then made to perform 7½ indicated horse-power at 70 pounds boiler pressure and 146 revolutions per minute, the exhaust escaping into the atmosphere at a back pressure of 17 pounds. The steam consumption per hour per horse-power was 45 pounds. The large automatic engine was then made to perform about the same indicated horse-power at the same steam pressure and revolutions, the cut-off being about one-fifth. The steam consumption per hour per horse-power was 35 pounds. The same work was then performed by operating the engine on the compound system at the same boiler pressure and same cut-off in the small engine and with 26 pounds receiver pressure and about one-half cut-off in the larger engine, the exhaust passing into the atmosphere from the larger cylinder. The ratio of the two cylinders made the ratio of expansion 4½, including clearances, or practically the same as the real ratio of expansion when the large engine was used alone, the clearance of the latter being 5 per cent. The steam consumption per hour per horse-power was 33 pounds. It follows from these results, that to obtain the 7 net horse-power required to operate the shop the indicated horse-power for the three methods would be as follows:

System.	Friction.	Net work.	Total or indicated H. P.
Small engine.	0.6	7	7.6
Large engine.	2.5	7	9.5
Compound engine.	3.1	7	10.1

The expense measured in steam consumed per hour will therefore be as follows:

Small engine. 7.6 x 45 equals 342 pounds.
Large engine. 9.5 x 35 equals 333 pounds.
Compound engine. 10.1 x 33 equals 333 pounds.

It is evident that so far as the coal consumed is concerned the three methods are practically equal. The best method will, therefore, be the one which gives the least wear and tear or the least trouble to apply, the first cost being too small in both cases to make interest a sensible factor. This makes the most economical method that which derives the required power with the large engine alone, as the load upon it is only about half its working capacity, and, consequently, the wear and tear is very

* From the Stevens Indicator.

light, and, as a matter of fact, the engine has done the work for years with far less attendance and repairs than would be required if the small engine was made to perform the required work. It is worthy of note that the greater proportional power required to overcome the friction of the automatic engine is due to the fact that its main shaft and fly-wheel, which cause the greater part of the friction, weigh much more in proportion to the total mean pressure on its piston than is the case with the small engine.

Luminous Fountains.

The great success obtained with luminous fountains at the Paris Exposition naturally led to new applications of this

is placed a box of metal, the lower part of which is formed of a mirror and the upper of glass. In this box are arranged six incandescent lights. In order to avoid the cracking of the upper glass heated slightly by the incandescent lamps through contact of water with it, a second pane of glass is placed above it a few inches. Above the mirror is a nozzle consisting of two concentric parts. The water is conducted to it by a special pipe hidden under the floor. The flow of water is regulated by valves, which are accessible to the person sitting at the head of the table, and who can change the effects to suit himself at any time. The change in the colors is obtained by interposing colored glass between the reflector and the jet of water. Each glass is mounted in a special frame,

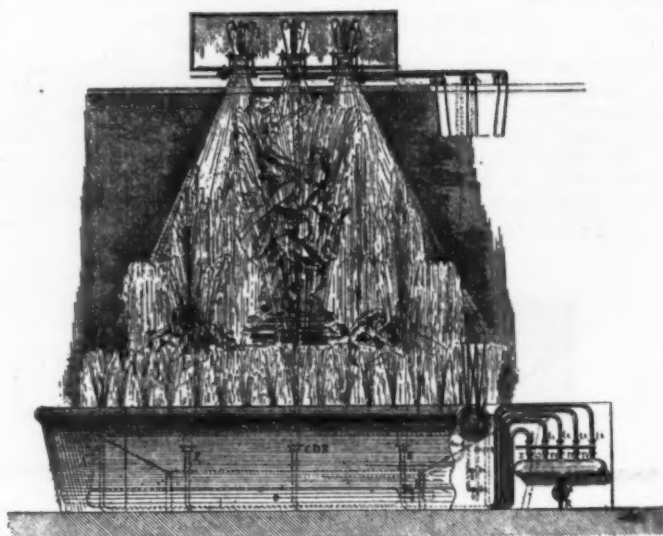


Fig. 2.—Elevation.

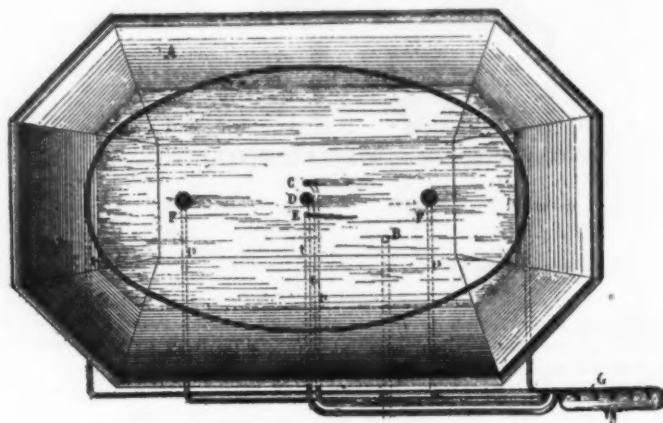


Fig. 1.—Plan.

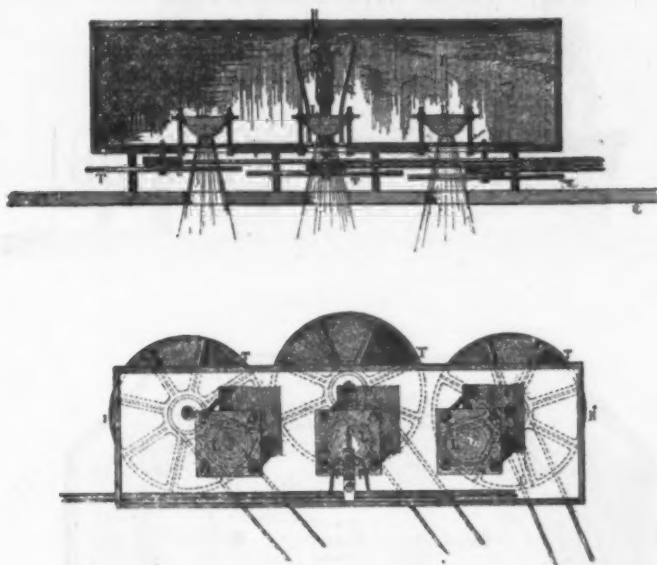
THE LE CALVE AND VAUZELLE LUMINOUS FOUNTAINS.

beautiful method of decoration. They possess a charm which few are able to resist, possessing incidentally, too, the advantages, besides their novelty, of causing no inconvenience through smoke, odor or danger of fire. A French authority, R. Gentilini, writing in *Le Génie Civil*, asserts that in a few years luminous fountains will constitute one of the ordinary methods of decorating public parks in all the large cities of France. In the article referred to he presents two new applications which have recently been made in Paris, one being that of a well-known French manufacturer, Gaston Menier, applied to domestic decoration. He has introduced a luminous fountain in connection with his dining-room table. The center of this table has been pierced by an opening about 3½ feet long by 3 feet wide, the opening being filled with a basin made of sheet zinc. In the middle of it

which slides in guides. They are arranged in twos, leaving between them a place to allow of the passage of the white light when the jet of water is not to be colored. A small chain running over pulleys and entering at the head of the table allows the person sitting there to change the effect, there being five sets of slides which may be combined in pairs to produce a wide variety of colors. In order to mask the details of the construction the table is covered around the fountain with flowers, so that it does not at first glance differ from an ordinary table bearing in its center a large bank of flowers.

A more elaborate application of the luminous fountain has been recently carried out by LeCalve and Vauzelle, of Paris, for a large café in that city, its principal feature being that the water is illuminated from above. All the other luminous fountains thus far constructed in

England and in France are lighted from below. The lights in this case are oxy-hydrogen lights, which have been preferred because the light is more intense and because the rays can be always concentrated at one point without the necessity of a regulator. In the accompanying figures these lights are shown at I. They are placed above a circular opening in the ceiling, there being three of them, each having 500 candle power. The design arranged for the interposition of colored glass is somewhat different, disks of glass divided into sections being used, which are covered with sheets of colored gelatine. The diameter of the disk is large enough to allow each sector to cover fully the openings in the ceiling. Wheels on the small axis, over which cords run, allow the operator to change the colors at will. The disks are shown in the accompanying engravings at T. The fountain proper consists of the octagonal basin A, in which are arranged the different jets of water, consisting of five principal jets, D in the center and C and two additional ones at F. The elliptical-pipe surrounding them has a number of small apertures. The pipe B is used to carry off the waste water. All of the jets are fed by special



Luminous Fountains.—Fig. 3.—Arrangement for Lighting.

pipes, t , t_1 , t_2 and t_3 , starting from the general pipe G. A series of valves, R, R₁, R₂, R₃, are used to regulate the height of the jets, in the case in question the whole being under the control of an engineer, who varies the play of the fountain in union with an orchestra.

Below the lights are lenses which may be raised or lowered so that the color of the light falling on the fountain from above may be varied. A general view and the details of construction are shown in the accompanying engravings, it being reported that the fountain in question is very effective.

The formal recognition of the United States of Brazil by this Government was completed January 29, when the President received the credentials of Senhor Valente, the Minister newly accredited by the provisional government, and also the credentials of Senhor Mendonca as Envoy Extraordinary and Minister Plenipotentiary on a special mission to the United States.

Pittsburghers are agitated by a report that Andrew Carnegie is surveying for a road 50 miles in length from the H. C. Frick Coke region through Verona, with the object of controlling the Western trade.

United States Men-of-War.

[With Supplementary Sheet of Engravings.]

It seems more than evident that the reconstruction of the United States Navy, which was begun in 1882 and which has been carried vigorously forward ever since, will produce by the end of the year 1892 a new fleet of some 30 vessels of all classes, and any one of which may be compared without disparagement to boats of the same type constructed in Europe. This policy of the Government has resulted not only in a fleet of first-class boats, but has introduced into the country an industry which before was wanting.

From time to time during the past eight years we have described very completely the several designs of vessels as they were brought forward and have endeavored to keep our readers fully informed regarding the methods of construction and the general plans. From the just published report of the Chief of the Bureau of Construction and Repair to the Secretary of the Navy for the fiscal year ending June 30, 1889, we take the accompanying en-

B. L. R., four 6-pdr, two 3-pdr, two 1-pdr, four 37-mm and two Gatlings. The average speed during a four-hour test was two-tenths of a knot above that given above. Both these vessels are well-known and their performances have been repeatedly chronicled.

We now come to two vessels which are building. The coast-defense vessel, known as the Monterey, is being constructed at the Union Iron Works, San Francisco. She is a twin-screw armored boat, carrying for her displacement the heaviest armor and armament afloat. She is fitted with submerging tanks, into which water is admitted when preparing for action, thereby bringing the ship 18 inches lower in the water and decreasing greatly the exposed portion to the fire of the enemy. Her principal features are as follows: Length on water line, 256 feet; extreme breadth, 59 feet; mean draft, 14½ feet; mean draft in fighting trim, 16 feet; displacement in fighting trim, 4486 tons. Her armor consists of a water line belt extending the length of the vessel, and for a distance of 119 feet protecting engines and magazine spaces it is 16 inches thick from the top to 6 inches above the cruising line, thence tapering to 6 inches at the armor shelf. Forward and abaft of this belt the armor is 8 to 6 inches thick, tapering to 5. Still forward and abaft the armor is 6 inches, tapering to 4. The plating back of armor is in two thicknesses of 20 pounds to the square foot. Fixed barbettes are worked for protecting the revolving parts of the gun-slides, turn-tables and general gearing for the 16 and 12 inch guns. The main battery is composed of one 110-ton 16-inch breech loading rifle. (The recent disaster to a similar sized gun in England and the difficulty and extreme cost of manufacturing heavy ordnance of this kind and particularly its unreliability will probably have the effect of reducing the bore of this gun to at least 13 inches). One 46½-ton 12-inch breech-loading rifle, one 15-inch pneumatic dynamite gun, six 33-pounder rapid fire guns. The large guns are all in armored barbettes. The dynamite gun is at a fixed angle coming through the deck just forward of the forward barbette. The engines of the boat are of the vertical inverted cylinder direct-acting triple-expansion type, and are expected to develop 5400 horse power and to drive the boat at a speed of 16 knots.

The barbette-turreted vessel Puritan is now at the New York Navy Yard, where the work necessary to complete her in accordance with certain revised plans has been commenced and will be pushed forward rapidly. She is 291 feet long on the load line, has an extreme breadth of 60 feet 1½ inches, a mean draft of 18 feet 2½ inches, and displacement of 6060 tons. Her armament consists of four 12-inch guns in barbette turrets, together with smaller arms. It is expected that her engines, which are horizontal compounds driving twin screws, will develop with natural draft 3000 horse-power, and a speed of 12 knots, and with forced draft 4000 horse-power, with a speed of 13 knots. The hull is protected by a heavy belt of armor which is thickest at points protecting the engines, boilers and magazine.

The prospects of holding a World's Fair in New York are less favorable owing to the local wrangles and jealousies of politicians some of whom are apprehensive that their opponents may derive some advantage from the promised "boom" as affecting the industries. There is still another class who are satisfied with the ordinary course of business, without resorting to artifice in working up an abnormal activity, filling the city with strangers and in other ways disturbing the regular routine of affairs.

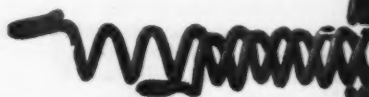
gravings, which were as far as possible selected so as to show different types of the more recent men-of-war.

The engraving of the Yorktown represents that boat going at a speed of 16½ knots. The Yorktown is of 1700 tons, has developed 3398 horse-power and has attained an average speed of 15½ knots. This has been exceeded in special cases, but it seems evident that the boat for a continued run of some duration can without doubt maintain this rate. The general dimensions of this vessel, which was built at Cramp's, are as follows: Length of perpendicular, 230 feet; extreme breadth, 36 feet; mean draft, 14 feet; displacement, 1700 tons. The engines are triple expansion, horizontal, driving twin-screws. The armament consists of six 6-inch B. L. R., two 6-pdr., two 3-pdr., one 1-pdr., two 37-mm and two Gatlings.

The Charleston is of particular interest, as she was the first vessel constructed on the Pacific Coast at the Union Iron Works. She is of protected cruiser type, having a length between perpendiculars of 300 feet, an extreme breadth of 46 feet, mean draft of 18½ feet and a displacement of 3730 tons. The twin screws are driven by horizontal compound engines, the maximum indicated horse-power being 7500 and the speed in knots 18. Her armament consists of six 6-inch B. L. R., two 8-inch

Wire Belting.

The form of the wire-belting manufactured by the Midgley Wire Belt Company, of Beaver Falls, N. Y., is clearly shown in the accompanying engravings. The first illustration shows a section of double thickness No. 16 gauge tempered steel wire belt, in which the edges are locked so that it cannot unravel. The cut at the right hand side is the exact size and thickness of the edges of the belt. At the center two coils of wire are shown partly removed. This is accomplished by drawing out the ends of the coils and then unscrewing the upper one until it is clear out, and then unscrewing the next one in the same way, when the belt is apart. By reversing the operation the belt is again

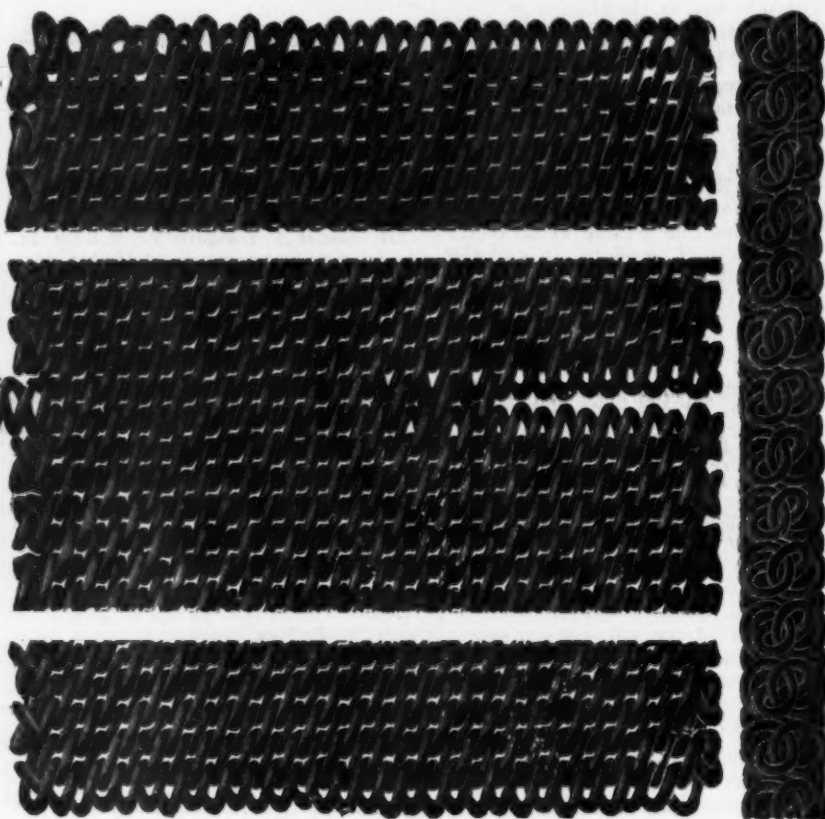


united, and with the ends of the coils bent back into place the work of what is called lacing is done. Any of these belts can be taken apart and a piece taken out, and shortened in the same way, the joint being so perfect that it is impossible to detect it. A belt made the same as the above but of finer wire and especially adapted for fast-running machinery, such as dynamos, is also made. For rolling mills and similar places where the work is very heavy, the belts are made of heavy strong wire. These belts are made of any desired widths.

The next illustration represents a section of single thickness elongated link wire belt of great strength, being by actual test at the Watertown Arsenal more than nine times as strong as single leather belting. A piece 12 inches wide will sus-

power between shafts placed a long distance apart. Round wire belts are also made for the transmission of power. The above company now have in operation in the manufacture of wire belting 14 small

covered there will be no perceptible lost motion. A further advantage of the latter is that they are unaffected by change of temperature or dampness. These belts have been found by actual service to be

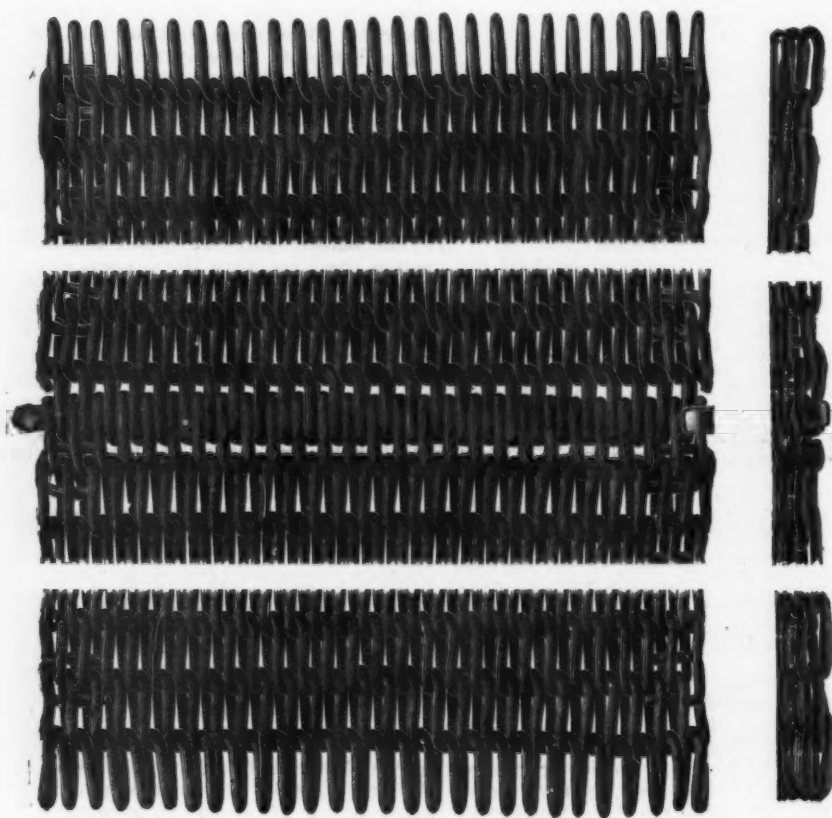


Double Steel Wire Belting.

machines and 1 automatic machine making belts up to 9 feet wide.

It is well known that where leather or

well adapted for heavy and continuous work under the most trying conditions.



Single Elongated Link Wire Belting.

tain a strain of 23,500 pounds before parting. At the center of the engraving is shown a flattened steel fastening. This style of belt is particularly adapted for overhead work and for communicating

rubber belting is used for transmitting power the driven pulley loses about 10 per cent. of its motion by slippage. With wire belts it has been found that if the pulleys are of suitable material or properly

Industrial Schools.—The new Mayor of Buffalo, Chas. F. Bishop, devotes a portion of his message to the subject of industrial schools and recommends the establishment in that city of an institution in which the curriculum shall embrace a course of study calculated to give boys practical education in such subjects as shall open the way and encourage them to enter the trades and vocations of artisans. He says: "It was not an extravagant statement recently made by a New England manufacturer: 'That it was far easier for him to get a clerk in his counting room capable of making a good translation of the Iliad or the Æneid than it was to get a workman in his factory capable of running his machinery.' The industrial employments offer greater opportunities for honorable and happy business careers than almost any other vocation, but success in industrial enterprises demands a knowledge of its fundamental laws and a practical acquaintance with the common tools by which skilled manual labor is produced. A manual training school does not teach trades nor make mechanics, but opens the way and lays the foundation. Manual training, says a distinguished writer, 'Is the bringing of the individual in contact with nature and material things, as the starting point for training the senses to become accurate servants to the brain and storing the mind with elementary ideas of the quality of things originally obtained.'" Throughout the country similar views are being pressed on public attention.

The Pennsylvania Railroad Company have secured direct entrance to McKeesport by the purchase of the McKeesport and Bessemer Railroad, which will materially aid in the handling of the enormous freight traffic offered by the iron and steel plants along the Monongahela River.

THE WEEK.

Lumbermen in the Maine woods, in Pennsylvania and Canada have cut millions of logs, but in the absence of snow are apprehensive that the spring floods will not be sufficient to float them to market.

Chicago expects soon to have two elevated railroads.

The future of the export trade of the United States is spoken of very hopefully by President Roberts, of the Pennsylvania Railroad, who said in a conversation last week, "I have a notion that we are on the eve, as a nation, of becoming an exporter of manufactured products to a larger extent than ever before." The time has now been reached when the economies and the magnitude of our enterprises, backed up by capital which has become more and more abundant from year to year, will venture into new fields. This growth of manufacturers and the increase of capital is always the forerunner of an extended business. As I said, I believe we have now reached the time when our industries will seek success in the markets outside the domestic market which they have heretofore depended upon. The fact that we always have had, and always will have, a large and profitable domestic consumption of our products of the soil, and our manufacturing industries gives us an advantage over older producing countries, where the great mass of manufactured articles have to seek a market outside the home market."

The president of the Mercantile Exchange in Baltimore says Western produce can be bought cheaper in Glasgow and Liverpool than in some of our seaboard cities in consequence of discrimination in freight charges by American railroads.

The new State of Washington includes a region almost as little known as the interior of Africa. The country inclosed by the Olympic Mountains, comprising an area of about 2500 square miles, is not known to have been explored by any one. These mountains rise within 10 or 15 miles of the Straits of San Juan de Fuca in the north, the Pacific Ocean in the west, Hood's Canal in the east and the basin of the Quinault Lake in the south and are from 6000 to 8000 feet high.

Russia increased her exports of oil to European countries during 1889, though not so much as during the previous year. The total shipments from Batoum for 11 months amounted to 166,741,000 gallons as against 129,360,000 for the same time in 1888. England took 31,000,000. The next largest customers were Austria, Turkey, Belgium and Italy, in the order named.

The condition of affairs in the Argentine Republic is anomalous. The farming classes are prosperous, being able to dispose of their products at good prices in European markets, but among the mercantile classes excessive taxation, high rents and the depreciation of currency are having the effect to check the demand for goods, forcing a number of importing houses into liquidation. Another effect is a large accumulation of deposits in the banks.

Advices from Washington indicate that the hope of acquiring the Mole St. Nicolas as a naval station in Hayti has been wholly abandoned. French influence is inimical to a concession of that character, and is supposed to be in the ascendancy. As a matter of fact, the finances of the republic are controlled by Frenchmen. The only bank in Hayti, the Banc Nationale, in Port au Prince, is in French hands, and French capital is met with everywhere throughout the island, though in the North that of Germany predominates. The Haytian Minister of Foreign Affairs, A.

Firma, is said to have publicly expressed "reluctance to accord to the United States exclusively all economical advantages, commercial and maritime," even though not in conflict with the idea of national sovereignty.

Trade in California is paralyzed by the snow blockade.

More large ore docks will be built at Cleveland without delay, and the Pennsylvania Railroad Company have given a contract for a large amount of dredging preparatory to the increasing of the ore-handling facilities at Erie.

Dr. Gatling, inventor of the famous gun bearing his name, is in Philadelphia selecting a site for new gun works.

The vessel tonnage of Nova Scotia now amounts to 569,722 tons, it having increased nearly 20,000 tons last year.

The Canadian Pacific's plans include a steamship line to Europe from St. John and a "bee" railroad line through Calais and Bangor to Boston and New York. It is calculated that the distance between St. John and New York will be shortened to 24 hours, enabling the Canadian Pacific to compete with the various foreign steamship lines in the Atlantic trade. The Maine Central, which forms a part of the Canadian Pacific system, has at present no direct line to New Brunswick, but in 1890 and 1891 will build a line from Bangor to Calais and thence continue over a road purchased by Russell Sage two years ago, securing the direct line to St. John—the new route—to be known as the shore line. Bangor people, therefore, rejoice in the prospect of "centering on the Northeastern shore of this Continent the great Canadian Pacific system and the New York and New England Maine Central system."

Canadian millers are making a desperate effort to shut American wheat flour out of that market.

The largest crops ever obtained in California are expected as a result of the copious rains.

The rotary snow-plows are ponderous machines. One of them, weighing 85 tons, while being hauled by a heavy engine on the Illinois Central Railroad, caused two pile bridges to sink.

The Legislatures of the various States have passed laws so severe on trusts that the Whiskey Trust has called a meeting of its holders of certificates to be held in Peoria, Ill., February 11, to consummate the proposed change from a trust to a gigantic company incorporated under the laws of Illinois. Recent legal decisions bearing on the affairs of the Sugar Trust have had a great deal to do with the proposed change. Its business is that of making alcohol and spirits and feeding cattle from the corn meal left after the process of distillation. There are nine trustees who manage the affairs of the Distillers and Cattle Feeders' Trust. They have for some time been watching the popular drift of feeling against trusts, and the laws inimical to them, and have at length determined to advise the proposed change to avoid litigation.

Brazil will soon have a new coinage in gold, silver, nickel and bronze.

In the manufacture of lumber Michigan still ranks first in the United States as regards the volume of the output. The principal manufacturing points are the Saginaw Valley, Lake Huron Shore, Manistee, Ludington, Muskegon, White Hall, Grand Haven and Spring Lake, the Green Bay district, Manistique, along Lake Superior and other points in the Upper Peninsula. The manufacture of lumber and shingles is also extensively carried on along the lines of the Mackinaw division of the Michigan Central, Flint and Pere

Marquette, Detroit, Lansing and Northern, Grand Rapids and Indiana, and Chicago and West Michigan railroads, in the Lower Peninsula, and on all the principal railroad lines in Upper Michigan. The product of the State last year was:

Lumber, feet.....	4,207,741,224
Shingles.....	2,008,430,250
Lumber on hand, feet.....	1,447,503,997
Shingles on hand.....	364,307,250

The gas-fixture combination formed last July was broken up by the withdrawal of one of the largest firms in this city.

The mechanism of the new metal bridges authorized to be constructed at the North River ferry landings across West street is described as follows: The Jersey Central viaduct will be constructed in one span of 81 feet from the second floor of the ferry-house to the second floor of the building opposite; it will be 8 feet wide, 8 feet deep and 16 feet in the clear above the pavement. On the west side of the street a passageway to the present ferry-house will be constructed. Ultimately it is intended to replace the present ferry-boats with double-deck boats. The Pennsylvania viaduct will span West street diagonally from the building at the southeast corner of Cortlandt street to the ferry-house, with which it will connect at the second floor. It will be similar in plan of construction to the Jersey Central viaduct, but will be much larger, to meet the requirements of the larger traffic. There will be one span of 100 feet, without pillars, piers or other obstructions in the street or on the sidewalk. It will be 13 feet wide, 16 feet in the clear above the pavement and 8 feet high. Stairs will lead directly from the easterly end of the viaduct, inside the building, to Cortlandt street.

Three bills have been presented to the Dominion Parliament to provide for reciprocity in towing and wrecking with the United States. They provide for mutual aid in cases of distress, regardless of nationality.

The United Glass Company, of Syracuse, were formed a few weeks ago by the union of three manufacturers of window glass, with actual property valued at \$1,583,500. To extend operations \$6,000,000 capital has been authorized, \$400,000 to be preferred stock.

The National Convention of Master Builders, lately in session at St. Paul, adopted a resolution relative to the eight-hour movement, to the effect that the association, as a central body, representing many different constituents, is not competent to define a certain number of hours for the building trades generally to adopt, but that the local bodies should adjust the number of hours as circumstances may dictate. The following officers were elected: President, John J. Tucker, New York; first vice-president, A. M. McAllister, Cleveland; second vice-president, Anthony Iltnier, St. Louis; secretary, W. H. Saywood, Boston; treasurer, George Tapper, Chicago.

The Old Colony Railroad has purchased valuable wharf property at India Point, Providence, and report says all the Sound boats will sail from there instead of Fall River.

The Nottingham Colliery, in the town of Plymouth, Pa., one of the most productive in the anthracite region, was wrecked by an explosion of gas on Saturday and seven men lost their lives.

The assignee of some of Graff, Bennett & Co.'s property in Pittsburgh, sold a lot of real estate and stocks on Friday, for the benefit of creditors.

Governor Moyer, of Nebraska, is making a persistent effort to induce the railroads to reduce their freight rates on corn. In a letter to the railway presidents he represents the poverty of farmers in the midst of

plenty. The situation in Nebraska is probably worse than in other States, owing to the fact that the farmer is compelled to use railroads for corn shipments exclusively, and the haul is long. While railroad rates are on a reasonably fair basis, they are high as compared with the price of cereals, which, owing to two successive great crops, are unusually low.

Citizens of New Brunswick, N. J., strongly disapprove of the plan for an elevated railroad through that city as submitted by the Pennsylvania Railroad Company, and insist upon underground tracks.

The Colombian Government has contracted with an American company represented by Mr. Lockett for the construction of a railroad 350 miles in length. The only subvention is a large grant of land.

A large number of electric drills have been introduced in the coal mines of the Hercules Company, in Pennsylvania, reducing the cost of mining to less than 1 cent a bushel. The Tesla motors are employed.

An electric tramway is about to be introduced in Rome, Italy, by English engineers.

The Building Inspector of Philadelphia reports that the month just closed was the most active January in building operations known in the history of the office.

A scientific expedition, organized under the auspices of the Academy of National Science, in Philadelphia, will leave New York 15th inst to visit the least known parts of Yucatan and Mexico. The party will be under the leadership of Prof. Angelo Heilprin, and will devote special attention to geology and paleontology.

The sanitary authorities of New Orleans are making special efforts to clean the city.

There are pending before the City Council of Baltimore and in the Legislature propositions to expend in improving and developing that city about \$20,000,000. In addition to \$3,000,000 already expended on steel railways, \$3,000,000 will be devoted to Belgian street pavements and improved rails, cars, &c. An elevated railroad and a belt line railway are comprised in the general scheme to promote quick transportation.

The engineer's plans for the elevation of the tracks of the Pennsylvania Railroad in Jersey City have been approved by the Mayor. They provide for 13 feet headway at every street crossing. All the iron-work has been contracted for, and will be ready May 1 for use in construction.

The Delaware and Hudson Canal Company have under contract 15 locomotives and 450 freight cars.

The Minnesota State Dairy and Food Commission in carrying out the provisions of the law in regard to adulterated food compounds has adopted the wise conclusion that the most speedy and effective method for arresting the present widespread adulteration of food is by simply giving publicity to the facts, and to this end there are published frequent reports showing the results of the analyses of different food compounds sold by different establishments.

It is officially declared by the Boston Fire Marshal that the recent great fire in that city was caused by defective electric wire insulation.

A rapid transit commission in Brooklyn, appointed by Mayor Chapin, is considering the feasibility of an underground arcade road on Atlantic avenue, which has been ruined for building purposes by the tracks

of the Long Island Railroad. It will be necessary to build six miles of road, costing \$650,000 per mile.

The New York Commissioner of Public Works, Thos. F. Gilroy, in whose department the sum of \$4 353,000 was expended in 1889, has made his report to the Mayor. In extending and improving the distribution of water 18.93 miles of additional water mains were laid. The system for distributing the water supply now includes 657.19 miles of water mains, with 6760 stop cocks and 8420 fire hydrants. During the year 1659 additional water meters were placed, making a total of 19,870 now in use. The average daily consumption of water through meters is 37,483,300 gallons. In the extension and improvement of the sewerage system 28,279 lineal feet of sewers, 1274 lineal feet of culverts and 46 receiving basins were built, and the sewerage system on Manhattan Island now includes 433.73 miles of sewers, with 5209 receiving basins. Work is in progress for a canal and tunnel to divert the water of the Byram River into the Bronx River by which the supply from that source will be increased by 6,000,000 gallons a day.

The large iron ferry-boat Texas, built for the New York and Brooklyn Ferry Company, to run between Twenty-third street, New York, and Brooklyn, was successfully launched at the shipyard of the Harlan & Hollingsworth Company on the 1st inst. She is 175 feet long and 188 feet over all, 36½ feet beam molded and 62 feet wide over all and 14½ feet depth of hold. She will be driven by a jet condensing beam engine. Steam will be supplied by one boiler capable of sustaining a working pressure of 45 pounds to the square inch.

Charles A. Preston, secretary of the Haytian Legation, and N. Deslauer, consul at New York, have resigned. It is rumored that Haytian Minister Preston, at Washington, will be removed in a few days.

Secretary Tracy has the warm sympathy of the entire community in the calamity which befel his household in Washington City. Suddenly bereaved of his wife and daughter, victims of a fire which originated in his dwelling on Monday morning from some unknown cause, and himself rescued at the last moment from suffocation through the heroic efforts of the firemen, he will for some time to come be incapacitated for the discharge of official duties.

To License Engineers.—The bill to be presented to the Rhode Island General Assembly relative to licensing engineers will provide for a board of examiners to be appointed by the Governor with the advice and consent of the Senate. They are to be appointed to serve for one year, and are to be men of known capacity and acknowledged ability in steam engineering. There is some objection to the bill, principally on account of economy, as it is claimed the condition of the State Treasury is such that it will not warrant any additional expenditures. Against this the friends of the bill say that engineers, should they be passed by the examining board, should be compelled to pay a fee for their license or certificate of competency. The fees received in this way would, it is asserted, be more than sufficient to defray all the expenses of the proposed board. There are a good number of men who are now working as engineers who are bitterly opposed to this movement, but the first-class men claim that it will be a step in advance.

Many of the engineer officers of the navy are resigning to accept position in civil life. This is believed to be due to the development of the shipbuilding interest in this country.

MANUFACTURING.

Iron and Steel.

Mechanical stokers are being put in under the boilers at the Beaver Falls mills, of Carnegie, Phipps & Co., Limited, at Beaver Falls, Pa.

Some very curious reports, from a metallurgical point of view, have appeared in the newspapers lately concerning the Carbon Iron Company, of Pittsburgh, Pa. The use of graphite has been discarded, and for the last two years coke has been used as the agent for the reduction of the iron ore. The company have now a capacity for producing about 60 tons per day of carbon squeezer blooms direct from the ore. Matthew Graff, vice-president of the company, informs us that in the near future this will be increased to 100 tons a day or more. For two years two 15-ton furnaces have been run night and day, and now two 30-ton furnaces are being built, which will give the works a capacity of about 200 tons of ingots per day. The steel is being rolled chiefly into bridge and structural steel plates on a large universal mill.

The furnace of the Gadsden Iron Company, at Gadsden, Ala., has blown in, after making repairs.

B Furnace, of the Crozer Steel and Iron Company, at Roanoke, Va., has been blown out for repairs.

The East Tennessee Land Company, of this city, are organizing a company to build a furnace at Harriman, Tenn.

The Rome Iron Company have broken ground for a charcoal furnace at Rome, Ga.

The second furnace of the Pioneer Mining and Mfg. Company, at Thomas, near Birmingham, Ala., has gone into blast. No. 1 during 1889 made 41,272 tons of pig iron.

The Longdale Iron Company, at Longdale, Va., have purchased from the heirs of the late C. R. Mason, for \$40,000, the Big Hill iron ore property near Galawater, on the Richmond and Allegheny Railroad.

Articles of incorporation of the Enterprise Iron and Land Company and the Hope Iron and Land Company have been filed with the Register of Deeds in Duluth. Both are organized for the purpose of mining and smelting iron and copper ore and manufacturing and otherwise disposing of the product. The capital stock of the first is \$50,000, with a limit of indebtedness of \$50,000. The officers, who are also the directors and incorporators, are Joseph Frank, president, Chicago, Ill.; Emil Hartman, vice-president, Duluth; Leopold Moss, general manager, Chicago; Lazarus S. Minzesheimer, secretary, Chicago; David Goodman, treasurer, Chicago. The capital stock of the Hope Iron and Land Company is \$25,000, and the limit of the indebtedness is \$25,000. The officers are the same as those of the Enterprise Company, with the exception of Lazarus Silverman treasurer in place of David Goodman.

The Straight Fiber Iron Company, of Chicago now employ about 150 men, operating two busheling furnaces and four heating furnaces. They turn out of their two busheling furnaces about 30 tons of muck bar per day, and from their four heating furnaces 90 tons of finished iron. They aim to make a high grade of bar iron in sizes from ½ inch, round or square, up to 24 inch, and in flats from 1 by ½ inch up to 6 by 1½ inches. The mill dimensions are 192 feet by 234 feet. The building is practically fire-proof, with not a foot of timber in its construction. The walls are of brick, with iron trusses and

roof. The machinery is of modern and improved construction. Compressed air hoists are operated on every train, so that the changing of rolls is a matter of small labor and still less waste of time. Oil burners are being put on all the furnaces, it being the intention of the company to use oil exclusively as fuel. They aim to make their mill a model of its kind and expect to show very good results when they have passed the first six months, which is the trying time of all new mills. The works are located on the stockyards tracks at Fortieth street and Stewart avenue. All the railroads centering at Chicago can run their own engines into the company's yard, giving them unsurpassed shipping and receiving facilities. The officers are as follows: J. McGregor Adams, president; Walter L. Lee, vice-president and manager; D. P. Donelson, treasurer; F. Newell, secretary; M. C. Williams, superintendent. A city office is maintained in the Rookery Building, room 769.

The Knoxville Iron Works, at Knoxville, Tenn., are reported to have in contemplation the restarting of their nail mill.

Bibb Furnace, at Briarfield, Ala., will go into blast about March 1 on charcoal car-wheel iron.

Proton Furnace, at Cleveland, leased by Pickands, Mather & Co., will go into blast on Bessemer iron about the 15th of February.

One of the stacks of the Coplay Iron Company, at Coplay, Pa., is undergoing repairs, and is being to a large extent modernized. It will be one of the largest furnaces in the Lehigh Valley.

The in-wall of the Hunnewell Furnace, Hunnewell, Ky., fell in last week and had to be shoveled out. There was only three weeks' stock on hand.

Bellefonte Furnace, owned by the Means & Russell Iron Company, of Ashland, Ky., will go out for repairs on the 15th inst., to be idle until June.

Machinery.

Schleicher, Schumm & Co., of Philadelphia, report that the demand for larger horse-power engines is steadily growing. The Oshkosh Gas Company (Wis.) have ordered one of 100 horse-power, which is now ready for shipment. The Oshkosh Company also control the Racine Gas Light Company, who have two 50-horse-power engines furnishing power to the electric light company. These engines have proved remarkably economical in their working. The same amount of coal per lamp hour was found to be required to be distilled into gas which the steam boilers converted into ash. In the case of the gas engine, the carbonizing of the coal produced coke and tar, the sale of which returned a large proportion of the cost of the coal. Besides this, the handling of the fuel could be done to better advantage in the gas-house than in a separate boiler-house. The sale of small power engines is maintained, but there is a rapid increase in large power both for coal gas and producer gas.

Architect John H. Wagner has about completed plans for two large factories, which the Link Belt Machinery Company will erect at Thirty-ninth street and Stewart avenue, Chicago. They will be one story high, the one occupying a ground space of 120 x 408 feet and the other 112 x 130 feet. They will be constructed of brick, with interior and roof work of steel construction. Work will be commenced as soon as the contracts are let.

Miscellaneous.

Notice is given that application will be made February 25 for the charter of a

corporation to be called the Mill and Mine Electric Equipment Company, Pittsburgh, Pa., for the manufacture and sale of electrical and mechanical appliances and the carrying on of the electrical and construction supply business.

The annual meeting of the stockholders of the Springfield Emery Wheel Mfg. Company, Springfield, Mass., was held January 29. E. R. Hyde, D. T. Homan, Geo. W. Jackman, Fred. E. Smith, Charles A. Warner and D. B. Hyde were elected directors for the ensuing year, with E. R. Hyde president, D. T. Homan vice-president, Geo. W. Jackman treasurer and O. H. Hyde secretary. The company were organized under the laws of the State October 22, 1889, with a paid-up capital of \$150,000. They purchased the assets and liabilities of the Springfield Glue and Emery Wheel Company, of Springfield, Mass., and are manufacturing in that place, but are building large factories at Bridgeport, Conn., which they expect to occupy about March 1.

The Beardsley & Monat Mfg. Company have been formed at Chicago to deal in hardware; capital stock, \$10,000; incorporators, O. L. Beardsley, L. Monat, Jr., and E. J. Whitehead.

The Caldwell Mfg. Company, corner of Frank and Centre streets, Rochester, N. Y., are occupying the shops formerly used by the Rochester Sash Balance Company.

A new car-building plant of large dimensions is projected in the vicinity of Chicago. T. W. Harvey, a prominent lumberman, is one of the leading capitalists interested in the projected enterprise. Steel cars are to be built, after a design embodied in a postal car which has been running for some time on the Monon route between Chicago and Louisville and Cincinnati. The officers of the road are very enthusiastic in their praise of the new car, so that it would seem to have proved a success. No wood whatever is used in its construction. It is asserted that the company forming to build these cars will locate a town within a few miles of Pullman, to rival that model industrial city. It is to be named Harvey. Plans have been prepared for very large shops, embracing a foundry, machine shop, smith shop, erecting shop, paint shop, &c. One of the buildings will be no less than 1500 feet long by 115 feet wide.

Among the corporations recently licensed in Illinois are the following: Rockford Electric Railway Company, at Rockford, to operate a street railway, capital stock, \$150,000; incorporators, H. H. Robinson, George M. Blake, Fred Haines. Munger-Colton Mfg. Company, at Chicago, to deal in hardware specialties; capital stock, \$20,000; incorporators, H. H. Munger, C. L. Munger, G. A. Colton. The Shonts Boiler Purge Company, at Chicago, to manufacture boiler purge; capital stock, \$25,000; incorporators, A. C. Meynard, N. E. Shonts and V. H. Surghun. Hinckley Mfg. Company, at Aurora, to manufacture fine tools and machinery; capital stock, \$10,000; incorporators, C. C. Hinckley, J. R. Tucker and G. W. Hinckley. Walter Mining Machine Company, at Chicago, to construct mining machines; capital stock, \$100,000; incorporators, John M. Walter, F. B. Dyche and H. K. Allen. Columbia Mfg. Company, at Chicago, to do a general manufacturing and mercantile business; capital stock, \$2,000,000; incorporators, Irwin Veeder, P. R. Shumway, O. R. Barnett. American Gas Engine Company, at Chicago, to deal in gas engines; capital stock, \$200,000; incorporators, Charles Fellows, C. W. Annable, N. C. Johnson.

We recently published a note briefly describing the packings made by the Garlock Packing Company, and in which we

mentioned Elmira as being the location of the northern factory, when it should have been Palmyra, N. Y.

The Lynchburg Zinc Works, at West Lynchburg, Pa., began operations on the 20th ult.

Value of a Test Department.

BY PAUL KREUZPOINTNER, ALTOONA, PA.

The question of the value of a test department is being freely agitated. The Master Mechanics' Association has appointed a committee to report at its next meeting on the cost and management of such a department, and the question has been discussed editorially and otherwise in the *Railroad Gazette*.

A well established system of testing and inspection of materials is not antagonistic to the interest of the manufacturer. In most cases the manufacturer welcomes specifications because they give him a working basis. He knows how far to go and is relieved of a good deal of responsibility. If there is antagonism it is not directed against the principle and policy of having test departments. It is often due to a faulty organization of such a department when it ignores the methods and processes by which materials are produced. Hence conditions may be imposed which unnecessarily raise the price of material or fail to make any discrimination between the quality of materials from different makers, provided each maker's material meets specifications. Thus the greater skill, knowledge or honesty of one maker finds no appreciation, but all are forced upon one common level which may or may not be a very high one. Thus cases may arise where the standard of quality of materials is lowered instead of raised and the confidence of the makers, otherwise so valuable and desirable, is lost. This is one of the hidden rocks on which the over-confident young commander of a test department may get wrecked.

Of the economic and educational value of a test department there can be no doubt. On the Pennsylvania Railroad the difference in percentage of rejection between different makers of a certain class of material fell from 1 per cent. to $\frac{1}{4}$ per cent. in six years after the establishment of specifications for that class of materials. Especially is this true in railroad service where the conditions tend so much to excessive wear and tear of materials, and the work of renewal alone is therefore a heavy item of expense. In the face of increasing competition, the clamor for cheaper transportation and more efficient service, testing and inspecting of the materials used is therefore simply an act of self-preservation. If in the renewal of rolling stock 16 new axles are required for 100 freight cars per annum, and by judicious investigation into the qualities of steel and rigid inspection two axles can be saved of these 16, then with an equipment of 50,000 freight cars, like on the Pennsylvania Railroad, this would mean a saving of 1000 axles per annum plus the expense for the work of turning axles and wheels. And since metals, especially iron and steel, form such a large and important part of the materials used on a railroad, and the writer is best familiar with this item his remarks apply chiefly to the use of these metals.

To make a test Department a success and to prevent it from becoming worse than useless and a laughing stock for the manufacturer and the practical man requires a broad mind, practical experience, scientific knowledge, sound reasoning and good judgment. The pedant is useful in a test department only as an assistant. One who is not able to appreciate thoroughly the mission which a test department has

to perform will make a failure of it. To know when to be accurate, painstaking, deliberate, slow in decision, carefully weighing every evidence and comparing the results of chemical and physical research, or on the other hand to know when to decide quickly, on the basis of a few well-known facts and general principles without detriment to the interests of the company requires a nicely balanced judgment and thorough knowledge of the qualities and properties of materials. Where these qualities are wanting there will be everlasting doubt, hesitation, uncertainty, want of decision and friction which wears out the life of a railroad officer and the test department will degenerate into a mere experimental station for the sole benefit and gratification of the one in charge where a great deal of work is done but nothing of value is accomplished.

The fullest benefits will be derived from a test department when the practical and the theoretical and scientific knowledge are so nicely balanced that whenever the one tends to descend too much in the scale it is counterbalanced by the other. To depend too much or entirely on chemical or mathematical formulas, on fine measuring instruments and a smattering of scientific facts will soon lead to wrong conclusions and errors whose correction takes years of annoyance, breakdowns and expenses. The very accuracy and ill-timed confidence in the use and efficacy of the fineness of instrument may lead to a change in the condition of the material while under test, if certain factors are not taken into consideration, so that the results may be too high or too low, and, therefore, misleading. For instance, the most careful chemical analyses and elaborate physical test are made of a cracked sheet, broken axle, tire or crank pin. The chances are that we are no wiser than before as to the cause of the fracture. Along comes the practical man, looks at the material five minutes and says, Why, this steel or iron was overheated, or "piped" or laminated, or very irregular. The moral is obvious and teaches us that, however valuable formulas and accuracy and fine instruments are, they are not the only means which give us an insight into all the factors tending to destroy materials. Therefore, too much reliance upon them will impair the value of a test department.

To know what to test and how to test it is the criterion of usefulness of a test department and its value to a road; to sift the accumulated knowledge and experience and apply it properly and at the proper time; to diffuse part of this valuable knowledge and experience judiciously among those officers and employees who have to use the materials tested is a feature which, though little practiced, adds very much to the value of a test department. He who understands to win and keep the confidence, good will and co-operation of the manufacturer, master mechanic and foreman for himself and the test department is master of the situation and his department will be a potent factor in the financial success of a railroad. The ability to generalize is more often called into requisition in the work of a test department than extreme accuracy and precision in the use of appliances for testing and experimenting. The latter, therefore, though most valuable as an assistant, will not be found so valuable in managing the affairs of a test department as the former.

The practical experience of those who are not college-bred should not be brushed aside contemptuously. Such experience is a very valuable auxiliary to a test department. A concern need not blame anybody if for the sake of saving a couple of thousand dollars annually for a competent man, for more help or for better appliances, ten times that sum is lost through avoidable leakages. Whenever the business of

a concern has grown to such proportions that several persons are employed, it may be found best to divide the physical department of a test department into what might be called mechanical and metallurgical sections. The one devotes its labors to the investigation of devices for the improvement of appliances, machinery, rolling stock, &c., and the other confines itself exclusively to the testing and inspection of metals.

The field to be covered is so large in each section that there is ample room for any amount of activity in each. These sections and those in charge of them should be entirely independent from one another. Each becomes necessarily a specialist in his branch and all his abilities are taxed to do justice to the work to be done. Consequently if one only is in charge, taste, inclination and circumstances will cause him to take more interest in one branch of the work than in the other, with the result that he loses sympathy with and thorough understanding of the needs of the other branch of work. One class of work therefore will suffer for want of attention. Routine work should be done by intelligent and reliable assistants, to leave time free for original research and the study of conditions and phenomena. The one in charge of the metallurgical section should be sufficiently versed in the processes of manufacture of the materials to be tested, so that he is not liable to be "stuffed."

The value of a test department is very much impaired if specifications are of such a nature that their provisions cause unnecessary annoyance and delay to the shops, or are so impracticable that they are slighted or go by default entirely. But, however well a test department may be provided and managed, if its system and specifications are not changed from time to time to meet changed conditions the work will soon be done on traditions only, its usefulness and reliability will depart and such a test department will be a burden and dead weight.

Summarizing the conditions necessary to make a test department valuable experience seems to suggest:

1. A division into chemical and physical departments and the latter again into a mechanical and metallurgical section.
2. A classification of materials into their uses by groups in order to be able to decide what and how to test; what needs to be the best grade and what not.
3. A division into commercial and scientific testing. The one to serve the needs of everyday service, the other to accumulate accurate data for future use and guidance.
4. Conform specifications to the needs and circumstances of the service and processes of manufacture.
5. To secure the confidence of manufacturers and the co-operation of the officers.
6. To change the system and specifications in time to suit altered conditions.

Three Great Boilers.—The Polson Iron Works Company, of Toronto, 28th ult., shipped to Owen Sound the last of four large boilers constructed by them for the car ferry they are now building at their shipyard there for the Canadian Pacific Railway Company. These boilers are the largest ever made in Canada and also the largest ever carried by rail on this continent. They are of the cylindrical return multitubular type, and are 13 feet 3 inches in diameter and 14 feet long, weighing 37 tons each. The shell plates are $\frac{1}{4}$ of an inch in thickness and were specially rolled in Scotland. The tubes are of German manufacture and are 4 inches in diameter, 11 feet long and 148 in number. There are in each boiler three of Fox's corrugated furnaces, 42 inches in diameter and

10 feet 11 inches long. The Government test showed an allowance of 94 pounds working pressure. The riveting of these boilers was done by a Tweddell hydraulic riveter, with a gap of 8 feet 4 inches, lately erected in the company's shops. The boilers when completed were lifted bodily on to the cars by a large overhead traveling crane, which has a lifting capacity of 50 tons.

Advance in Iron and Steel in England.

In their annual review, C. E. Muller & Co., of Middlesborough, England, give the following figures to show the advance in iron and steel in 1889 in that district:

	Advance					
	From			To		
	£	s.	d.	£	s.	d.
Rails, heavy sections.....	3	17	6	7	0	0
Iron plates.....	5	10	0	8	0	0
Steel plates.....	6	5	0	9	0	0
Iron bars.....	5	2	6	8	0	0

The advance in raw materials has been as follows:

	Advance	
	From	To
Steam coal.....	6/6	12/6
Gas coal.....	6/6	15/
Blast-furnace coke.....	11/6	30/
Foundry coke.....	13/	34/
Cleveland ore, 30 per cent.....	4/6	6/3
Rubio ore, f.o.b. Middlesborough	13/9	16/6
Campanil ore, f.o.b. Middlesborough.....	16/	19/

On manganiferous material the advance has been as follows:

	Advance					
	From			To		
	£	s.	d.	£	s.	d.
Spiegeleisen (30 per cent.)..	3	17	6	6	0	0
Ferromanganese (80 per cent.).....	11	0	0	17	0	0
Silico spiegel (10 Si., 18 to 20 Mn.).....	6	0	0	8	0	0
Ferro silicon (10 Si., 2 to 3 Mn.).....	3	10	0	5	0	0

Muller & Co. report that steel works and shipbuilders have work booked to cover their production for the first half of the current year.

The Naval Board appointed to inspect the ship yard of Moore & Co., at Elizabethport, N. J., for the purpose of determining its capacity for the construction of war vessels, has reported to the Secretary of the Navy. The report says that the plant now on hand, with certain additional tools and machinery, which could be easily obtained within three months' time, is sufficient for the construction of naval vessels of the smaller class, such as the two 1000-ton gunboats and the 800-ton practice ships, for the construction of which this firm has made a bid.

George Westinghouse, Jr., and other officers of the Standard Car Heating and Ventilating Company, of Pittsburgh, Pa., have become directors and large shareholders in the Consolidated Car Heating Company, of Albany. The interests of the Pittsburgh company are thus consolidated with the Albany company, which, by the arrangement, greatly extends the field of its operations and becomes the owner of an additional number of valuable patents and improved devices for heating and ventilating railroad cars and for lighting such cars by electricity.

John H. Inman, formerly of the Tennessee Coal and Iron Company, and its most influential director, filed on Monday in the United States Circuit Court his answer to the complaint in the suit of equity, to recover about \$2,000,000 brought by Thomas C. Platt, president, and the present board of directors of the company. Mr. Inman's answer is signed by John E. Parsons and ex-Governor Hoadley, Patrick Calhoun and Edward Baxter of counsel. Mr. Inman denies specifically all the charges made against him.

The Iron Age

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DAVID WILLIAMS, - - - PUBLISHER AND PROPRIETOR.
CHAS. KIRCHHOFF, JR., - EDITOR.
GEO. W. COPE, - - - ASSOCIATE EDITOR, CHICAGO.
RICHARD R. WILLIAMS - - - HARDWARE EDITOR.
JOHN S. KING, - - - BUSINESS MANAGER.

The Course of the Silver Market.

Once more silver has become quite speculative; it has been gradually improving in the London market, there now being quite a buoyant feeling. The following table will be of interest as showing the lowest, highest and average prices of silver for the last 20 years in pence per standard ounce:

Fluctuations in the Price of Silver.

	L.	H.	A.		L.	H.	A.
1870.	60 1/4	60 3/4	60 9-16	1875.	55 1/2	57 1/2	56 7/8
1871.	60 3-16	61	60 1/2	1876.	46 3/4	58 1/2	52 1/2
1872.	59 1/4	61 1/4	60 5-16	1877.	53 1/4	58 1/4	54 13-16
1873.	57 1/4	59 15-16	58 1/2	1878.	49 1/4	55 1/4	52 9-16
1874.	57 1/4	59 1/4	58 15-16	1879.	48 1/2	50 1/2	51 1/4

	L.	H.	A.		L.	H.	A.
1880.	51 1/2	52 1/2	52 1/4	1885.	46 1/2	50	48 9-16
1881.	50 1/2	52 1/2	51 15-16	1886.	42	47	45 1/2
1882.	50 1/2	52 1/2	51 13-16	1887.	43 1/4	47 1/4	44 1/2
1883.	50	51 1/2	50 1/2	1888.	41 1/4	44 1/2	42 1/2
1884.	49 1/4	51 1/4	50 1/2	1889.	41 15-16	44 1/2	43 1/2

The production of silver, in tons of 1000 kg. fine, from 1851 to 1888 inclusive, was as follows: 1851-60, 896; 1861-65, 1101; 1866-70, 1339; 1871-75, 1969; 1876-80, 2450; 1881-85, 2862; 1886, 3238; 1887, 3414; 1888, 3637.

The new year opened at 44 1/4 d. On January 27, 44 1/4 d was touched, and January wound up at 44 1/4 d. It will take several months before the world's production of 1889 can be ascertained or reliably estimated. The advance last year was chiefly due to the increase in the shipments of silver from Europe to British India, &c., which reached the equivalent of £6,009,518, as compared with £3,945,000, an increase of £2,064,518, or 5 1/4 per cent., in one year. Nothing has occurred on the Continent since the beginning of last year to operate in favor of the white metal, but from England rumors have arrived since the middle of last month that the Bank of England had resolved to issue pound sterling notes, redeemable in silver. It is re-asserted this month, per cable, that the printing of pound notes has actually begun, but nothing is added as to their being made redeemable in silver. The Government cannot adopt so radical a change without a special act of Parliament, nor are we aware that England is prepared to launch out into bi-metallism, as it would be contrary to the avowed policy of the Government. Besides, it would be a precarious undertaking, which could only cause harm in the future without doing any good now. But aside from these rumors, there is another cause nearer at hand which imparts restlessness and extreme sensitiveness to silver. We refer to the silver bill of Secretary Windom. The effect which this bill would have sooner or later on the price of the precious metal, if it were to pass as at present

modified by that official, is a subject upon which the opinions of the keenest financial men are widely apart. The more generally prevalent view appears to be that Congress will not be prepared to adopt the new policy of Mr. Windom, either at this session or the next, preferring probably to leave the silver question altogether untouched.

Recently J. J. Valentine, of Wells, Fargo & Co., published their usual annual report of the output of precious metals by the States and Territories lying west of the Missouri River for the year 1889, the four metals accounted for being gold, silver, lead and copper. They make the total of all the States \$123,000,000. Of this sum silver contributed 51 per cent., gold 26. Mr. Valentine remarks that in 1870 the yield of precious metals was little over \$50,000,000, and there has been a steady increase year by year. Last year showed an increase of \$14,000,000 over the year 1888, and from what Mr. Valentine says the prospects for the present year are brighter than ever. Mr. Valentine shows that \$50,000,000 worth of silver was exported to Japan, China, the Straits, India and other Asiatic countries. Of this amount London exported \$32,000,000, and San Francisco \$18,000,000. He adds that most of this silver is manufactured into bangles or amulets, and thus goes out of circulation. Mexico, he remarks, is coming to the front with both silver and gold. Owing to the encouragement the present Government is giving to the mining interests, Mr. Valentine predicts a large increase in the output. From Bolivia, too, prospects of silver production are of the most flattering kind. There are so many contingencies for or against a further rise in silver that caution may prove the better part of wisdom in running risks on its present value.

Lake Superior Iron Ore Production.

The Marquette Mining Journal has published its usual annual statistical statement of the production of Lake Superior iron ore, from which we learn that the entire output of the mines of that region in 1889 was 7,292,754 gross tons. The publication of these large figures is not a surprise, as the trade has been kept well informed of the shipments of ore from week to week. It is well, however, to have the accurate total of the year's business, and the statistical statement just made is extremely valuable on that account. Looking over the achievements of the year by this great ore-producing district, it is remarkable how closely the output of the mines was predicted even before any considerable quantity of ore was sold. It is now freely asserted that 9,000,000 tons will be mined and shipped during the season of 1890. Enormous as these figures are, and widely improbable as they would have seemed but a couple of years since, they are not discredited among the best informed members of the ore trade, but on the contrary are almost looked upon as decisively settled, in view of the very large sales which have already been made.

The decade closing with 1889 was a period of remarkable progress in the Lake Superior ore trade. It appears on an examination of the statistics of production that in 1880, the first year of the decade,

less than 2,000,000 tons were shipped from the entire region. It was not until after 1886 that these figures were doubled, when the mines of the Gogebic range began to swell the shipments heavily, and the Vermilion range also assumed somewhat important proportions. The gradual growth of the earlier years of the decade and the very rapid advance made in the last three years are shown in the following table of annual production:

The Production of Lake Ore.

Years.	Gross tons.	Years.	Gross tons.
1880.....	1,908,745	1885.....	3,466,372
1881.....	2,306,505	1886.....	3,568,022
1882.....	2,965,412	1887.....	4,730,577
1883.....	2,353,288	1888.....	5,055,411
1884.....	2,518,692	1889.....	7,292,754

Examining the figures of output credited to the different ranges, it is interesting to observe how well the mines of the Marquette range keep up the reputation of that district, which is the oldest in point of development. The Menominee range, next in age, also shows up well, but it has been distanced in the race by the Gogebic range, which is a strong competitor for leading honors. The Vermilion range, which was developed contemporaneously with the Gogebic, shows very fair progress, but it is as yet much behind any of the others in its annual shipments. The following table presents the annual output of the mines of each range for the past three years:

Production of Lake Ores by Ranges.

Ranges.	1887. Tons.	1888. Tons.	1889. Tons.
Marquette.....	1,851,717	1,918,672	2,634,517
Menominee.....	1,190,343	1,191,097	1,796,764
Gogebic.....	1,285,265	1,433,689	2,016,391
Vermilion.....	394,252	511,953	844,782

Totals..... 4,730,577 5,055,411 7,292,754

Remarkable progress was made in the decade in increasing the output of individual mines. In 1880 there were but 6 mines producing over 100,000 tons each; in 1881, '82 and '83 there were but 8; in 1884 only 7 were in this rank; in 1885 the number had increased to 9, and in 1886 to 10, but in 1887 a jump was made to 14; in 1888 to 16, and in 1889 to 22. The list of heavy producers is headed by the Norrie, with its 674,394 tons in 1889; next comes the Minnesota Iron Company, with 535,418 tons; next the Chapin, with 518,990 tons. The Chandler, Lake Angeline, Republic and Cleveland form a group by themselves, turning out from 274,000 tons to 306,000 tons. The Champion is the only other mine which exceeded 200,000 tons, although the Aurora and the Florence crowded that quantity pretty closely. The following table shows output of the large mines during the past three years:

The Production of Leading Lake Mines, Marquette Range.

Mines.	1887. Tons.	1888. Tons.	1889. Tons.
Lake Angeline.....	302,909	240,225	288,780
Republic.....	220,624	235,064	287,398
Cleveland.....	207,441	184,316	274,046
Champion.....	146,330	174,680	215,091
Braastad.....	74,067	86,789	155,341
Cliffs Shaft.....	87,346	78,520	134,616
Jackson.....	109,906	101,909	128,891

Menominee Range.

Chapin.....	336,128	290,871	513,990
Florence.....	79,399	142,586	196,269
Iron River.....	83,018	110,000	179,238
Vulcan.....	205,086	129,541	153,906
Dunn.....	34,677	118,091	151,828
Ludington.....	101,653	61,883	116,297
Commonwealth.....	56,609	61,818	108,515

Gogebic Range.

Norrie.....	217,254	412,196	674,394
Ashland.....	175,561	164,134	248,101
Aurora.....	159,252	179,937	196,732
Colby.....	258,518	285,880	336,833
Germania.....	61,714	53,918	108,169

Vermilion Range.

Minnesota.....	394,252	457,341	535,418
Chandler.....	54,612	306,220	

A number of other mines will this year increase their output to over 100,000 tons. In some cases this will be accomplished by mines which have hitherto ranked among the very small producers. Where is there another iron ore region in the world which can show such results? Up to the close of 1889 the entire quantity of ore shipped from the Lake Superior mines was 48,128,421 tons. Is another iron ore district in the world able to show such a record?

Exports of Iron and Steel.

A subject which has been attracting attention lately is the possibility of largely expanding our export trade in iron and steel. The occasional receipt of offers to purchase crude and finished iron has naturally suggested the possibility of such a movement, and the study of prices on both sides of the Atlantic seems to give encouragement to the idea. Always excepting the Canada markets, which we can reach quite well, and in which a largely-increased business has been actually done, we have thus far not gained much ground in other quarters. No one who has closely followed the course of events during the past six months really expects that the abnormal condition relatively of the primary markets in Europe and in America will continue for any length of time. No one conversant with the iron trade is likely to affirm that prices in England and Germany will long remain practically as high as our own, or will for any extended period be actually higher there than they are now, as they are in some lines. It is our mani-

The Bureau of Statistics has just issued a special volume which deals with our commerce with the countries represented in the Pan-American Congress, from which we abstract the following data. The figures given below for the United States cover the fiscal year ending June 30, 1888, while those for the United Kingdom, France and Spain are for the calendar year 1887, and those for Germany for the year ending March 31, 1887:

Exports of Iron and Steel.

To	From United States.	From Great Britain.
Mexico.....	\$1,946,948	\$1,050,804
Central American States....	879,020	676,906
Spanish West Indies.....	1,332,962	1,525,599
United States of Colombia..	710,492	553,686
Venezuela.....	404,402	500,841
Brazil.....	679,252	4,998,246
Uruguay.....	143,898	1,503,515
Argentine Republic.....	740,680	8,524,065
Chili.....	491,586	2,063,071
Peru.....	120,849	591,431
Totals.....	\$7,452,089	\$21,008,164

To	From France.	From Germany.	From Spain.
Mexico.....	\$149,382	\$118,048	\$48,978
Central American States.....	4,102		
Spanish West Indies.....	36,395	129,234	105,203
United States of Colombia..	329,895		30,953
Venezuela.....	19,181		
Brazil.....	507,029	633,794	
Uruguay.....	144,061		
Argentine Republic.....	995,990	1,825,460	18,398
Chili.....	143,333	224,672	
Peru.....	28,189	23,324	
Totals.....	\$2,357,557	\$2,954,532	\$203,533

A glance at this table reveals the fact that while we are doing fairly well with all the countries bordering on the Gulf of Mexico we are far behind England in the South American States.

Turning to the trade which our chief rival, England, commands in the countries whose trade we must make special efforts to capture, we may first examine the details for Brazil, which are given below, for a series of years:

	Hardware and Cutlery.	Machinery	Iron, wrought and unwrought.	Arms, Ammunition and military stores.	Implements and tools.	Telegraphic wire and apparatus.
	Dollars.	Dollars.	Tons	Dollars.	Dollars.	Dollars.
1880....	1,338,283	1,382,977	54,732	2,824,930	313,208	201,541
1881....	1,280,089	1,032,536	75,756	3,278,809	324,508	166,405
1882....	1,297,813	2,028,455	84,491	3,787,904	369,131	258,538
1883....	1,127,809	2,609,179	72,012	3,267,023	764,649	310,166
1884....	816,107	2,622,873	69,949	3,043,490	542,805	257,944
1885....	666,316	2,065,041	50,774	2,305,435	296,757	135,138
1886....	726,913	2,254,241	49,610	2,135,181	270,431	18,760
1887....	757,622	1,958,898	38,520	1,865,291	310,999	37,521
1888....	802,140	2,389,758	52,764	2,465,612	212,071	76,292

English Exports to Brazil.

fest destiny to become ultimately leading competitors for the world's trade in iron and steel, crude and manufactured. But the time for that struggle has not yet come, so far as the heavier and cruder forms are concerned. The present abnormal conditions may lead to a few scattered transactions. It would be misleading to base on them any hopes which the future is sure to shatter.

It is in other lines, notably in implements, novelties, hardware, household goods, ammunition and fire-arms, that the present condition of affairs should offer valuable opportunities, since in the cost of raw materials the advantage is not so heavily in favor of foreign competitors. It is true that this advantage is not of so much consequence as others which they still command. Still, American manufacturers are able to enter the contest on a better footing, and will probably be able to score some points in their favor.

The most tempting items are hardware and cutlery, machinery, arms and implements.

The English trade with Uruguay is, of course, of less importance, although it exhibits a notable increase in late years. The details are given in the following table:

English Exports to Uruguay.

	Hardware and cutlery.	Mach'y and mill work.	Iron, wrought and unwrought.
	Dollars.	Dollars.	Tons.
1880....	207,644	110,246	19,580
1881....	165,719	253,941	26,141
1882....	169,846	123,225	21,199
1883....	208,092	164,434	21,477
1884....	147,031	246,279	21,493
1885....	159,816	238,600	36,018
1886....	116,742	145,246	20,898
1887....	156,297	198,300	31,122
1888....	165,646	288,233	53,729

The boom in the Argentine Republic during recent years is reflected in the ship-

ments of goods to that country, the tonnage of iron and steel being very heavy.

English Exports to the Argentine Republic, in Dollars.

Years.	Hardware and cutlery.	Machinery and millwork.	Iron, wrought and unwrought.	Telegraphic wires and apparatus.	Arms, ammunition and military stores.
	\$	\$	Tons.	\$	\$
80	431,802	257,589	38,428	1,861,441	16,040
81	680,132	511,873	54,400	2,498,739	64,072
82	668,905	895,772	133,846	5,100,972	132,407
83	590,316	1,388,354	204,129	7,084,962	86,492
84	517,533	1,952,678	230,343	8,063,042	159,281
85	526,215	1,213,275	152,783	5,246,233	67,308
86	601,309	1,797,208	198,742	4,780,674	36,834
87	791,712	2,230,132	155,267	5,175,430	103,083
88	910,685	3,620,949	382,613	11,398,609	123,977

Chili, as will be seen from the following table, takes moderate amounts of English goods:

English Exports to Chili.

Year	Hardware and cutlery.	Machinery.	Iron, wrought and unwrought.	Arms, ammunition and military stores.	Telegraphic wires and apparatus.
	\$	\$	Tons.	\$	\$
1880....	301,660	189,492	19,174	1,036,165	239,163
1881....	439,065	302,258	20,046	1,138,026	443,825
1882....	573,132	410,883	28,913	1,477,095	150,862
1883....	468,775	464,717	30,834	1,494,726	102,060
1884....	419,045	409,540	42,228	1,738,236	89,364
1885....	341,964	303,556	25,497	1,117,640	45,526
1886....	245,822	206,257	29,444	1,183,221	134,702
1887....	327,431	410,134	36,104	1,371,073	69,060
1888....	270,723	432,525	39,361	1,704,005	70,073

Even poor Peru is recovering as a buyer, there being an improvement in the volume of English trade lately.

English Exports to Peru.

Year.	Hardware and cutlery.	Machinery and millwork.	Iron, wrought and unwrought.	Arms, ammunition and military stores.	Implements and tools.
	\$	\$	Tons.	\$	\$
1880....	46,198	54,529	3,517	182,800	311
1881....	56,349	131,003	3,940	178,960	3,932
1882....	94,123	304,925	8,106	412,037	20,970
1883....	96,634	338,553	7,531	343,628	22,318
1884....	102,902	247,491	11,308	488,076	37,886
1885....	59,571	297,556	5,254	248,931	18,196
1886....	89,573	156,096	6,846	290,801	35,341
1887....	56,758	140,306	7,598	358,354	14,799
1888....	70,749	214,107	16,012	568,646	38,791

Excepting the Argentine Republic, the tonnage of the cruder forms of iron and steel is not very large in any of the countries enumerated, compared to our own enormous home consumption. We repeat that we do not yet regard this field as particularly tempting. But there is now a good opportunity in many other branches which our manufacturers are sure to avail themselves of.

The decline in warrants from 65/7, the highest point reached for Scotch, on January 6th, to 54/9 and from 66/ to 54/9 in Middlesborough is clear proof that for the present the tide of speculation has turned against the bulls. It would be idle to deny that this is not sure to react upon makers' brands, since consumers will promptly withdraw iron from store as soon as the gap becomes too great. English newspapers report that after tests forced upon them by necessity founders have discovered that warrant iron is not really such wonderful stuff as many made it out to be.

when little of it wandered into the cupola. Possibly these reports are colored by the desire of consumers to escape any complications which might grow out of the knowledge conveyed to their customers that they are giving them goods manufactured from warrant iron. We do not remember having seen it stated in any of the English newspapers or merchants' circulars, as emphatically as with us in this country, that the scarcity is most marked in Bessemer grades of pig iron. It must be taken into consideration that the stocks reported of iron in Glasgow and Middlesborough are exclusively of other grades, not suitable for steel manufacture. The indications are that, relatively speaking, Bessemer pig is really scarce, and that, like with us, steel has found more eager purchasers than iron. In fact, so far as the latter is concerned, English manufacturers, like our own, complain that prices for product have not advanced in proportion to raw material.

An Unprofitable Year for Canada.

The annual report of the Montreal Board of Trade, speaking of the trade of the year, says: The year 1889 cannot, on the whole, be recorded as having been a prosperous one for Canada, though in some respects there is cause for satisfaction. In the council's report for 1888 mention was made of the increased number of failures in that year, but the figures for 1889 show a still greater number and a larger aggregate of liabilities, the number almost equaling the high totals of 1878, and being in excess of any year since then. The amount though, while exceeding last year's total by \$600,000, is less by \$1,500,000 than in 1887 and by over \$9,000,000 than in 1878. But upon taking into account the increase in the number of traders and manufacturers during the last ten years, amounting to over 40 per cent., an encouraging aspect is given to these comparisons, for while in 1879 one trade in every 29 failed, in 1889 only one in every 45 failed. The increase last year in the number of failures, which was confined to the upper Provinces, was mainly owing to the poor crop in Ontario of 1888 and to the disappointingly small yield of cereals in Ontario, Quebec and Manitoba this year, coupled with the low prices obtained for grain and the falling off in the demand from the United States for Canadian barley, owing to changes in the trade. In the lower provinces a revival of the shipbuilding industry, the improvement in seagoing freight rates, with fair crops and a better lumber business, united to make the year one of comparative prosperity. In many departments of manufactures and of the import trade business has been more profitable, if not larger in volume, than during previous years, owing to higher prices and better demand. Values of many kinds of raw material for manufacture have steadily advanced or remained firm, and prices of woollens and iron in the British market being firmer, there has not been the same disposition to cut prices, although competition has continued to be very keen.

A new corporation is to be formed at East St. Louis, Ill., under the name of St. Louis Steel Foundry. The capital stock will be \$75,000. The incorporators are Thomas Howard, Edward F. Goltra and John W. Harrison.

What are reported to be important deposits of manganese ore have been opened at Louray, Va.

CORRESPONDENCE.

Enterprises at Seattle.

To the Editor: The writer's attention has several times been called to an article which appeared in your issue of 26th ult., respecting some enterprises in course of completion here, nail works, rolling mills and smelting works, &c. I do not know your informant, but can only say that any such information could only be based or have been gathered by some "boomer" who certainly did not have the welfare and interest of our growing city at heart when furnishing any such libelous and fictitious information. While such works have been and are now contemplated, up to the present time nothing has been done, or is being done, toward the completion of same, and it will be doubtless several months before the details can be completed for making a move to carry out such an enterprise. While we all have great confidence in the future of our young city, believing she is destined in the near future to rank as one of the leading cities of the Pacific Coast, we think it no more than just that all information going out from our midst should be of a character based on the true merits on which she is being built up, so that in the end we will be the gainers.

Yours respectfully,

GEO. B. ADAIR,
President Seattle Board of Trade.

SEATTLE, WASH., January 28, 1890.

Improvements in Gas Furnaces.

To the Editor: Not being a friend of polemics I shall thank you to let me state that the "improvement on gas furnaces," published by me, really is different from the design referred to by Mr. Reuleaux. An improved shape of the port flues has been used in this country for several years, but not in both chambers as I have shown it and not in the same manner. In trying to show his arrangement to be the better one, he gives the only and very peculiar reason: it has been done so in Germany. But he may not forget that improvements are possible even on improved things. Please let me express my thanks to the gentleman for not having the least doubt (very justly) that the design was original with me.

M. WEIS.

STEELTON, February 2, 1890.

The Lining of the Whiting Cupola.

By the peculiar shape and the arrangement of the tuyeres, which tends to distribute the blast evenly and prevent spotty burning, the Whiting cupola, manufactured by the Detroit Foundry Equipment Company, has secured a saving in fuel. Recently their attention has been called to another result, the saving in the lining. In ordinary cupolas the lining soon burns out in spots, making a new lining necessary frequently. The Detroit Car Wheel Company, who use four Whiting cupolas, have just made an interesting report bearing on this point. In their soft shop cupola No. 2, having a shell 6½ feet outside diameter, they have melted in the six months ending January 1, 1890, 13,416 tons of iron without relining. The other cupolas showed equally good results.

Saving Our Forests.—The American Forestry Association has had introduced into Congress a bill for the preservation and protection of forest lands on the public domain, and to establish a commission to examine the condition of said lands and report a plan for their permanent management. The nation has in forest lands from 50,000,000 to 70,000,000 acres that are now left neglected, so that timber can be cut down or burned with impunity. These lands will, in the future, be needed to

supply the Western States with the timber required for their manifold industries, and their preservation against wanton destruction is called for as a means of rendering agriculture more certain through the influence of the forests on the water supply and the climate. In order to prevent enormous losses, both direct and indirect, it is necessary that these forest tracts should be placed under competent administration, and the request of the Forestry Association that a commission be appointed to take this subject into consideration, and report to the President and to Congress a plan for the proper management of the forests, is one which can be heartily commended. The cost to the Government would be small, while the gain that it might secure would be of inestimable value.

PERSONAL.

George Schumann has been, since the failure of the Reading Iron Works, connected with the Pennsylvania Iron Works, of Philadelphia, as engineer and superintendent.

The constructing engineer for the improvements at Tampico harbor, Mexico, is Elmer L. Oethell, of Chicago. The expenditure will approximate \$2,000,000.

The following persons are the candidates for office to be elected at the annual meeting of the American Institute of Mining Engineers: Abram S. Hewitt, president; Henry M. Howe, S. F. Emmons and H. S. Munroe, vice-presidents; Joseph D. Weeks, W. J. Taylor and S. T. Ullman, managers; Troden D. Rand, treasurer and Rossiter W. Raymond, secretary.

J. B. Randols, of New Almaden, Cal., has been appointed special agent of the Eleventh Census for the collection of the statistics of quicksilver.

Frederick A. Sheffler, formerly superintendent and general manager of the Erie City Iron Works, of Erie, Pa., has accepted the position of acting-general superintendent of the Washinghouse Electric Company, of Pittsburgh, who are at the present time getting ready to extensively introduce their line of new arc lighting from long-burning carbon arc lamps, the demand for which at the present time is beyond the capacity of the works.

V. H. Rood, formerly chief draftsman of the Barr Pumping Engine Company, of Philadelphia, has accepted the position of superintendent of the Jeanesville Iron Works, J. C. Haydon & Co., located at Jeanesville, Lucerne County, Pa. The change took effect on the first of the month. As soon as Mr. Rood can accomplish it the above works will take up, in addition to their regular line of machine pumps, the designing and building of special pumps for all kinds and conditions of service, for which the regular trade pumps are not adapted.

A number of changes have taken place in the personnel of the Allegheny Bessemer Steel Company, at Pittsburgh, through the inability of E. L. Clark and others to give its management so much of their time and attention as requisite. J. S. Slagle, of Nimmick & Co., becomes president in the place of E. L. Clark, who, however, retains his interest intact. Geo. Bolton is vice-president, W. G. Park treasurer and John W. Doubleday secretary, the latter, with Mr. Bolton, representing the Duquesne interest. H. P. Smith will devote his attention to looking after the outside business. With an ample supply of gas the management hopes to increase the product of rails from month to month.

It is reported that H. H. Porter, of Chicago, prominently identified with many leading interests in that city, will soon go to California for a few months' stay.

The Connellsville Coke Trade.

The Connellsville *Courier* prints the following review of the coke trade of that famous region:

The coke trade of the Connellsville region for 1889 beats the record from 15 to 20 per cent., and is altogether immense. But, big as it was, the record for 1890 will, unless all signs fail, not only equal, but surpass it. With such a comforting assurance for the future, we may contemplate the past with some degree of complaisance. During the year just ended the Connellsville coke operators marketed 326,220 cars of coke, aggregating 5,825,000 tons. A large portion of this immense output, the greatest output in the history of the greatest coal region in the world, was sold at prices near the dollar mark, yet the average price of the total output was about \$1.40 per ton, at which rate the spot value of the yearly output would be about \$8,150,000. The output for 1888 was in round numbers 5,000,000 tons, of the average value of \$1.20, making a total value of \$6,000,000. These figures show a decided increase in trade during the past year, in spite of the very dull manner in which it opened. The beginning of 1889, it will be remembered, ushered in a declining coke trade, which continued into February, when production and shipments were 25 per cent. below January figures. Production was therefore restricted both by allowing ovens to grow cold and by ordering lay-off days. The demand increased somewhat in June, but the Johnstown disaster retarded Eastern shipments considerably. The July output rose to the January average, but the August strike cut it down again to the February figures. Since then it has been hovering between 500,000 and 600,000 tons per month.

The following is a statement of the estimated tonnage for 1889, condensed from the weekly reports collected by the *Courier*:

January.....	524,447
February.....	417,280
March.....	433,060
April.....	418,534
May.....	454,250
June.....	421,178
July.....	497,115
August.....	415,254
September.....	513,190
October.....	600,624
November.....	537,645
December.....	593,219
Total.....	5,825,826

The shipments for 1889 show a grand total of 326,220 cars, an average of 1046 cars per day for every working day in the year. Following is a comparative statement from the *Courier* files, showing the shipments during 1888 and 1889, with the daily averages appended:

1888.	Pitts.	West.	East.	Total.	Av.
January.....	4,125	13,600	2,500	20,225	778
February.....	3,500	10,500	4,500	18,500	740
March.....	2,925	12,000	4,000	18,925	680
April.....	2,000	12,600	5,000	20,200	808
May.....	4,300	13,800	6,700	24,800	919
June.....	4,900	9,400	4,800	19,100	766
July.....	4,000	10,700	5,800	20,500	790
August.....	5,350	12,450	6,650	24,450	905
September.....	5,270	13,916	6,140	25,326	1,013
October.....	5,900	17,900	5,925	29,725	1,100
November.....	6,225	17,685	6,060	30,070	1,156
December.....	6,800	17,900	6,100	30,800	1,174
Totals.....	55,095	162,511	64,835	282,441	905

1889.	Pitts.	West.	East.	Total.	Av.
January.....	6,650	16,125	5,640	28,415	1,052
February.....	5,300	12,700	4,725	22,725	947
March.....	5,713	14,437	5,426	25,576	934
April.....	5,366	13,736	5,881	24,773	951
May.....	5,375	15,150	6,045	26,567	984
June.....	6,000	15,050	6,350	27,400	1,020
July.....	6,154	15,910	6,804	28,868	1,050
August.....	5,560	12,240	4,967	22,767	898
September.....	5,815	16,155	5,284	27,254	1,090
October.....	7,325	16,550	6,180	30,055	1,113
November.....	6,640	18,659	6,152	31,451	1,210
December.....	6,800	20,300	6,600	33,700	1,348
Totals.....	72,778	187,021	66,421	326,220	1,046

The prices for coke for 1889, like those of 1888, ran the gamut from \$1 or less to \$1.75 or more. The operators started out in 1888 by dropping the figure from \$2, to which coke had gotten during the latter part of 1887. Within three months it was down to the dollar mark. The two concluding months of the year saw a big demand and a modest advance in price to \$1.25. This figure held good for the first three months of 1889, in spite of a declining demand, but April 1 saw a slumpy market, and in a few short weeks dollar coke again ruled. During the midsummer it was hard to get 90 cents for it. In August the workmen took the bull by the horns by demanding an advance in wages equivalent to 12 per cent. They enforced it by a successful strike and prices perforce went up from \$1.35 to \$1.50. A booming trade set in and sustained this rather radical advance. November and December coke sold for \$1.75, with special orders as high as \$1.90 to \$2. A determined move was made to put the price to \$2 with the beginning of the present year, but more conservative counsels prevailed.

The following table gives the prices of coke for the last six years, on board the cars at ovens, per ton of 2000 pounds;

Month.	1884.	1885.	1886.	1887.	1888.	1889.
January.....	\$1.00	\$1.10	\$1.20	\$1.50	\$1.75	\$1.25
February.....	1.00	1.10	1.35	2.00	1.75	1.25
March.....	1.00	1.10	1.35	2.00	1.50	1.25
April.....	1.10	1.20	1.35	2.00	1.00	1.15
May.....	1.10	1.20	1.50	2.00	1.00	1.10
June.....	1.10	1.20	1.50	2.00	1.00	1.10
July.....	1.00	1.30	1.50	2.00	1.00	1.00
August.....	1.10	1.20	1.50	2.00	1.00	1.00
September.....	1.10	1.20	1.50	2.00	1.00	1.35
October.....	1.10	1.20	1.50	2.00	1.00	1.50
November.....	1.10	1.20	1.50	2.00	1.25	1.75
December.....	1.10	1.20	1.50	2.00	1.25	1.75

Among the notable features of the coke trade of 1889, aside from those already touched upon, two stand out in bold relief, namely, the car famine that was and the coke king that is. As soon as the fall trade began to boom and the operators knew once more what it was to have orders to their full capacity, the railroads betrayed an inability to handle all the traffic. Both cars and motive power seemed inadequate. Some of the larger operators, despairing of a remedy, bought large numbers of individual cars. These, together with the cars furnished by the railroads, last month, for the first time, were able to meet the demands made upon them.

During the year the H. C. Frick Coke Company succeeded in purchasing controlling interests in a number of ovens, buying several of their largest competitors outright. Their holdings now cover about two-thirds of the region. They made their principal purchases during the summer when trade was dull, with prices nearer 90 cents than \$1. The year has also been marked by considerable activity in the oven building line. As a consequence the total number of completed ovens in the region has increased from 13,975 to 14,458.

The new foundry and blacksmith shop for Stevens Institute, at Hoboken, is about completed, and the classes began work in it last week. The shop is very commodious. It has six blacksmiths' forges, with a blast worked by steam-power and one furnace for remelting pig iron, with a draft supplied by a stack 75 feet high. There are also 12 molders' benches. This new foundry will in future allow the September preliminary term to be dispensed with, as both the sophomore and junior classes will be able to work during July, while the senior class will be engaged in the course of experimental mechanics.

Washington News.

(From Our Regular Correspondent.)

WASHINGTON, D. C., February 3, 1890.

The Committee on Ways and Means have completed the tariff bill upon which they have been so industriously at work since the assembling of Congress, and will introduce it as soon as a favorable opening offers in the midst of the pending parliamentary struggles over the contested election cases which have been prepared for report.

The Smith contest of West Virginia having been disposed of, the majority of the members of the committee are in favor of acting upon at least four or five other cases before settling down to regular legislative work. The margin of majority is so small that there is no leeway for sickness and other legitimate causes for absence. With the seating of Smith and the Kelley vacancy the Republicans have 169 votes all told, or but four over a quorum. The election of Reyburn in the Kelley district this month will make 170 Republican votes, but still give them but four over a quorum, as the filling of the Kelley vacancy will bring the personnel of the House up to its full number, thus making a quorum 166. This is regarded as a very small majority with which to handle a measure like the tariff. It is possible that Chairman McKinley, acting under instructions of the committee, will report the bill this week and ask its recommitment. The bill is substantially as already stated in the line of the Senate bill. The principal cut will be about 50 per cent. on sugar, with a bounty to American growers. The latter feature is experimental. The metal schedule is treated with a slight reduction in the aggregate, but is a more thoroughly protective measure than the existing statute.

It is evident from confidential sources of information among the leaders in Congressional circles that the present session will run far into the summer and possibly into the early fall in order to carry out certain plans which they have in view with reference to the November Congressional elections.

The general features of the metal schedule of the new bill show that iron ore will remain at 75 cents a ton, pig iron at $\frac{1}{10}$ cent, or \$6.72, and scrap iron and steel is made only such as has been in actual use and fit only for remanufacture. Bar iron remains the same, at \$22 a ton; shapes of rolled iron not specially enumerated and round iron $1\frac{1}{16}$ cents a pound, a reduction of $\frac{1}{16}$ cent; railway bars of iron or steel, railway bars of steel, T rails and flat rails, $\frac{1}{16}$ cent a pound, or a uniform rate of \$17.68 a ton. Wire rods remain at $\frac{1}{16}$ cent, with the proviso that all iron or steel rods, whether rolled or drawn, smaller than No. 6 wire gauge, shall be classed and dutiable as wire, and wire of iron or steel not smaller than No. 10 is reduced from $1\frac{1}{4}$ to $1\frac{1}{8}$ cents, while from No. 10 to 16 is lowered to $1\frac{1}{8}$ cents from 2 cents a pound.

The same readjustment runs through this branch of the schedule. Castings have been slightly raised. In hoop iron there is a reduction of $\frac{1}{16}$ cent on some grades. To cover the cotton tie evasions the law provides that hoop or band iron or steel, cut to length, or wholly or partially manufactured into hoops or ties for baling purposes, barrel hoops or flared or splayed, shall pay $\frac{1}{16}$ cent per pound more duty than that imposed on the hoop or band iron or steel from which they are made. The Mills bill made these articles free. Tin plate, now at 1 cent a pound, which the Mills bill made free, is raised to a protective rate which has not been finally determined, but probably $2\frac{1}{4}$ cents a pound. All metal produced from iron

or its ores by the various patent processes which is cast and malleable is denominated steel.

Steel Alloys.

James Riley, the general manager of the Steel Company of Scotland, has again dealt with the subject of alloys of steel with other metals, this time in a lecture to the Greenock Philosophical Society, in honor of the anniversary of the birth of James Watt. *Engineering* prints the following abstracts, with comments on some of the points brought out:

Since the production of his paper on the "Alloys of Nickel and Steel" at the Iron and Steel Institute, the pros and cons of several alloys have been discussed more freely than formerly. A great deal, for instance, has been said and written of the advantages to be derived from the use of aluminum in the manufacture of steel, but so far as Mr. Riley's experience goes, and it is of considerable extent, he thinks this usefulness is considerably overrated. The use of aluminum in the molten steel, Mr. Riley says, greatly increases its fluidity and reduces its melting point, and thus enables one to make castings which shall be sound, and which, being cast at a lower temperature, shall be less subject to the hot cracks due to contraction. But then equally good results can be and are obtained without its use, as he had demonstrated to more than one of its advocates. Further experience led him to the conclusion that the strength and ductility of steel are not improved by additions of aluminum, even if they are not slightly impaired. Thus, then, as this metal is as yet a very costly one, although daily becoming less so, it is only in a tentative, careful manner that he would use it. We may incidentally note that it is stated that a factory for the making of aluminum by the electrolytic process as used in Neuhaus, Switzerland, is about to be formed in Austria. Hitherto it has been used most largely for opera-glasses and as a small ingredient in the manufacture of cast steel, by which the metal is made more tenacious. The high price has hitherto hindered a more general use of the metal for industrial purposes; but as the system to be adopted will reduce the cost of production it is probable that its price will result in its being used in many directions.

The alloys of iron and manganese steel need not be dealt with here. Chromium, largely used as an alloy with steel, particularly for war purposes, was next referred to, and here Mr. Riley, although he did not mention it, was speaking with the authority of a producer of chrome steel, as his company have recently provided protective plates of this metal for a Japanese cruiser building in the Clydebank yard. Chromium, like aluminum, he says, is somewhat expensive to use, its first cost being considerable and the loss by oxidation great. Considerable care and skill are required in the production of chrome steel to get the necessary amount of chromium present together with a reasonable amount of carbon. The effects of chromium in steel are shown in increased hardness and strength and some loss in ductility, in increased facility for hardening and tempering in water or oil, and also in great difficulties in machining. In working this steel at the hammer or rolls care must be taken that

the masses of steel are heated very gradually and not to a very high temperature.

"The most important of the alloys and the one which is likely to prove of greatest interest, because of its great utility," is ferro-nickel or nickel steel. No serious difficulties, he says, are met with in alloying it with iron or steel to any extent, no special plant required. Most remarkable properties are possessed by this steel, properties which vary to a very large extent, according to the contents of the nickel. When present to the extent of not more than 7 per cent. the effects are a great augmentation of the hardness and tensile strength, a very considerable raising of the elastic limit and much less corrodibility. As in the case of manganese steel, so in the region between 7 per cent. and say 20 per cent. of nickel the alloy becomes exceedingly hard, somewhat brittle, and it is utterly impossible to machine it. Beyond this region its properties are again modified, very great ductility being found, together with high tensile strength and practical incorrodibility.

Steel containing, say, not more than 5 per cent. of nickel has an elastic limit of about 28 tons, an ultimate tensile strength of over 40 tons, with an extension of over 15 per cent. on 8 inch. This steel can be machined with moderate ease, and stands punching very well, both in its annealed and unannealed condition. As a demonstration of its great importance, he mentioned that with nickel steel the engineer had the means placed in his hands of nearly doubling boiler pressures without increasing weight or dimensions. It will be remembered that when the subject was being discussed at the Iron and Steel Institute the question of the manufacturing cost of nickel was raised. Then Mr. Riley said he had a vague notion, arrived at by some very casual calculations, that the cost of production would not be prohibitive. And at the more recent lecture he said that the probability of the introduction of nickel steel into the industrial arts has developed considerable excitement among the owners of mining property where nickel is found, and he anticipated that in no long time the supplies of this metal would be so much increased that it will be possible to supply the steel at prices which will not be considered at all unreasonable. He made no intimation as to manufacture, but the Steel Co. of Scotland, it may be taken, will be ready to supply nickel steel when called upon by any of the numerous clients.

Speaking of steel made by the basic process, Mr. Riley was very pronounced in his opinion. The basic process, he said, has been useful to the world in general, but as yet has been sadly disadvantageous to Great Britain. This, he thinks, is in part due to the distrust which has attended the use of basic steel in this country, a distrust which will not be easily removed from the basic Bessemer process, but for which there is no ground in connection with the open-hearth basic process. The whole operations in the basic Bessemer process are of such a character as to render it peculiarly easy to produce metal which shall not be thoroughly homogeneous and of a perfectly reliable character. He knew and frankly admitted that by the exercise of the greatest skill and care this can be avoided, and thoroughly good steel be produced; and evidence of the truth of this remark has been furnished in the steel sent out from works in the West of Scotland. Yet none the less did he assert that only in the open-hearth furnace can the basic process be conducted with such uniformity, regularity, certainty and comparative ease as will warrant that firm confidence in results which has been developed with regard to acid steel of high quality.

The Importance of Industrial Education.

Among the papers read at the annual convention of the National Association of Builders, recently held at St. Paul, was one by Richard Deeves, of New York, on the "National Importance of the Industrial Education of the Youth of the Country." The speaker was very earnest in the presentation of his views, and the applause that greeted him showed how thoroughly the convention approved of what he said. His remarks were directed against the labor unions that sought to advance their interests by preventing young men from learning trades. Parts of Mr. Deeves' address were as follows:

What would be thought by the people of this nation, or how long would they tolerate it, if all the farmers of the country were to combine and agree in order to keep up prices and that they could live more at ease to create an artificial scarcity by cultivating only a portion of the soil, or if the owners of the coal and iron mines of the country were to do the same, and cause a scarcity of their products, and thus raise the price on the consumers? Would not the people and the nation have the right for self-protection to put a stop to such conspiracy and punish the conspirators? Yet we are allowing this very thing to take place in the labor industry of the country, and we raise but a very weak voice against it.

With our immense population of more than 60,000,000 of people there are less persons learning trades to-day than there were 25 years ago. Cut off our foreign mechanics to-day and not increase the number of apprentices and before many years the nation would be robbed of the means of material advancement. As a proof of this within the last year the stonecutters' unions passed a resolution shutting out the stonecutters called "birds of passage," who come over here from Europe in the spring, working here all summer and fall for good wages, and when the winter sets in go back to their homes, taking the money they have saved with them to be left on the other side, and repeat the same thing year after year; and as a consequence of shutting out so large a number there was a great scarcity of good stonecutters in our large cities and the progress of building greatly delayed. With this policy of the unions I am in full sympathy, if at the same time they will remove restrictions placed on the industrial education of our youth. The plasterers are now very largely dependent upon the foreign supply, and becoming so scarce that in the busy season they can demand almost any wages. This certainly is not a healthy state of things for the nation and people when we cannot either educate mechanics or import them.

The restrictions on the youth of the nation in the learning of the industrial pursuits is in a very large measure the cause of so many of our youths being inmates of reformatories and penal institutions. Go into our courts and jails and you will find the large majority of offenders are under 25 years of age. Idleness the world over breeds crime, and when the youth of our nation are shut out of honest employment a large portion will turn their hands to dishonesty. The hands and the brain must be kept legitimately employed. I am ready to concede the right of every man, and consider it his duty, to better his condition, so long as he does not interfere with the rights of others, but for any man or body of men to set our laws in defiance and endeavor to trample on the rights of others our laws cannot be made too rigid or punishment too severe for them if we would preserve manhood and liberty.

TRADE REPORT.

Chicago.

Office of *The Iron Age*, 59 Dearborn street,
CHICAGO, February 3, 1890.

The condition of the market is decidedly much better than it was a fortnight since. Buyers are more disposed to take hold, and transactions have latterly been increasing in volume from day to day. Irregularities still exist, and all the weak spots have not disappeared, but they are losing their effect and sellers are correspondingly strengthening their position. In some lines the concessions recently prevalent can still be obtained from concerns anxious to book orders for quick delivery, but full prices are wanted for deliveries a month or two hence.

Pig Iron.—An improved tone has developed in Pig Iron circles the past week. While the market is not generally active, the volume of business has increased. The trade is in an uncertain frame of mind, however, and positive opinions are rarely heard. A significant circumstance is the attitude of those who were but lately pronounced bears. They are now hedging, as they find values so steadily maintained in the face of adverse circumstances, which are now beginning to lose their force. The Malleable Iron syndicate purchased several thousand tons of Lake Superior Charcoal, paying close to our quotations. This curtails very considerably the available supply and strengthens the Charcoal Iron situation. Very little Iron of this character is offering from second hands. More inquiry is noted for Coke Iron, and more sales are being made than during the greater part of January. Speculative lots of such Iron are disappearing, and some consumers who a week since were very anxious to make resales have changed their minds, finding that they will probably need all that they have contracted for. A rather significant circumstance is the urgency shown by numerous consumers in hastening deliveries due them from furnace companies. It now looks as though the market might be depended on to broaden quite considerably during the present month, but without materially affecting prices. Makers' quotations are still as follows, for cash, f.o.b., Chicago:

Lake Superior Charcoal,	\$23.00 @
Local Coke Foundry, No. 1,	19.50 @	\$20.50
Local Coke Foundry, No. 2,	19.00 @	20.00
Local Coke Foundry, No. 3,	18.00 @	19.00
Am. Scotch (Strong Soft), No. 1,	21.25 @	22.00
Ohio Silveries, No. 1,	19.75 @	20.00
Southern Coke, No. 1,	20.75 @
Southern Coke, No. 2,	20.25 @
Southern Coke, No. 3,	19.75 @
Tennessee Charcoal, No. 1,	22.00 @	22.50
Alabama Car-Wheel,	26.00 @	27.00

Bar Iron.—Quite a number of country buyers placed orders for nice specifications last week. Local mills are still securing the bulk of this business. Car orders are pending which are expected to result shortly in some good sales. Makers quote: Car specifications, 1.85¢ @ 1.90¢, flat. Ordinary specifications are quotable at 1.90¢ @ 1.95¢, half extras, f.o.b. Chicago, for Common Iron. Store prices range from 2.1¢ to 2.2¢, according to quantity.

Plates, Tubes, &c.—Manufacturers' agents have been booking good orders for Plates and report an active inquiry. Dealers have also had a good demand from consumers, some of whom bought quite heavily. The local houses report their January trade the heaviest yet known in that month. Carload lots from mill are quoted at 2.80¢, Chicago, for Nos. 10 to 14 Iron Sheets; Steel do., 3¢; Tank Iron, 2.70¢; Tank Steel, 2.90¢. Small lots from store are quoted at the following rates: Nos. 10 to 14 Iron Sheets, 2.90¢; No. 16 do., 3¢; No. 18, 3.25¢; Nos. 10

to 14 Steel Sheets, 3¢ @ 3.25¢; No. 16 do., 3.50¢ @ 3.75¢; No. 18 do., 3.75¢ @ 4¢; Tank Iron, 2.75¢ @ 2.80¢; Tank Steel, 3¢ @ 3.10¢; Shell Iron and Steel, 3.25¢; Flange Steel, 3.50¢; Fire-Box, 4.25¢ @ 5.50¢; Boiler Rivets, 4¢ @ 4.25¢; Norway Rivets, 40 ¢; Boiler Tubes, 1½ inches and smaller, 45 ¢; 2 to 4 inch, 50 ¢; 4-inch and larger, 52½ ¢.

Sheet Iron.—Black Sheets have been inactive, with standard qualities quotable at 3.30¢ @ 3.35¢, Chicago, in carload lots from mill, for No. 27. Small lots of No. 27 from store are quoted at 3.40¢ to 3.50¢, according to quantity. Galvanized Sheets continue to enjoy a lively trade, small lots of Juniata selling at 50 and 10 ¢ to 60 ¢ off.

Merchant Steel.—Railroad business keeps up and the country trade is improving, making the outlook very cheerful. Jobbers are taking advantage of the high mill prices, however, to cut under for trade, having an advantage in stock secured when rates were lower. Manufacturers quote carload lots of Machinery Steel at 2.75¢ @ 2.85¢, Chicago; Toe-Calk, 2.75¢ @ 2.85¢; Spring, 2.75¢ @ 2.90¢. Small lots of Tire and Soft Bars are sold at 2.50¢ from store; Machinery, Toe-Calk and Spring, 3¢ @ 3.25¢; Tool, 7½¢ and upward; Crucible Sheets, 7¢ @ 10¢.

Steels Rails and Fastenings.—Inquiries for Rails are still confined mainly to new projects, on which payments would be somewhat uncertain, hence makers are slow to close. Established roads hesitate to pay the price now asked—namely, \$38—so that current business continues light. Fastenings are similarly affected, but inquiries are in the market which may soon develop in transactions. Quotations are as follows: Iron Splice Bars, 1.90¢ @ 2¢; Spikes, 2.25¢ @ 2.30¢; Square-Nut Bolts, 2.80¢ @ 2.85¢; Hexagon do., 2.95¢ @ 3¢.

Old Rails and Wheels.—Old Iron Rails are weaker. Sales have been made at \$25.50, delivery in interior of the State, but \$25 is now the best bid for them. Old Steel Rails, on the contrary, are in good demand, even Canadian consumers coming in this market for their supply. The local consumption will further be greatly increased soon by the starting of a large works which will use them largely. Short pieces are still quoted at \$20 @ \$20.50 and long lengths at \$21.50 @ \$21.75. Old Car-Wheels are quiet and quoted at \$19.75 @ \$20.

Scrap.—The market was somewhat better early in the week, but the demand quickly fell off, leaving prices as weak as before. Dealers quote selling prices as follows, 7½ ton of 2000 lb: No. 1 Forge, \$20 @ \$21; No. 1 Mill, \$16; Nos. 2 and 3 Mill, \$11; Horseshoes, \$19; Old Axles, \$25.50; Pipes and Flues, \$15; Cast Borings, \$10; Wrought Turnings, \$14; Axle Turnings, \$15; Stove Plate, \$11; Machinery Cast, \$14; Mixed Steel, \$15.50; Coil Steel, \$17; Leaf Steel, \$18; Tires, \$18 @ \$18.50.

General Hardware.—In Shelf Hardware a very great improvement is noted. Business is now assuming large proportions. Every mail brings in heavy batches of orders, notwithstanding the bad roads which are afflicting so many Western districts and impeding local trade. The demand is mainly for Builders' and other Hardware, and is not made up of staple goods to any extent. From present appearances jobbers predict that within the next 30 days they will have the heaviest trade Chicago has ever seen. Jobbers manifest a tendency to stiffen up prices generally. The Heavy Hardware jobbers also report a very much better trade and a great deal heavier in volume than that of last year at this time.

Barb Wire.—The demand is light in proportion to the volume of business in Hardware generally. Painted is moving at 3.35¢ for small lots and 3.25¢ for carloads, and Galvanized at 60¢ @ 100 lb higher. A meeting will be held on Wednesday, in this city, of all manufacturers and jobbers west of Pittsburgh, to discuss the situation and to take some action with regard to prices.

Nails.—Cut Steel Nails are so quiet that it is difficult to quote factory prices. Many manufacturers prefer to stay out of the market at present rather than demoralize prices, which would be inevitable if any considerable number of them endeavored to force business in this dull season. Jobbers in need of a stock, however, are carefully sounding the market and are buying to better advantage than they could in the middle of January. The inquiry for Wire Nails is quite active and prices would be higher if some of the leading makers manifested less anxiety for business, but they have probably accumulated stock which it is desirable to convert into cash. Small lots of Nails from stock are quoted at \$2.65 @ \$2.70 for Steel Cut and \$3.15 for Wire, with 5¢ off for carload lots.

Pig Lead.—Sales of about 600 tons are reported at 3.65¢. For spot Lead the same price is quoted, but 3.67½¢ is asked for futures.

Philadelphia.

Office of *The Iron Age*, 230 South Fourth St.,
PHILADELPHIA, Pa., February 4, 1890.

Pig Iron.—There is no improvement in the demand, but the steadiness of prices is beginning to attract attention. It is agreed that if prices can be maintained on such a dull market as we have had during the last six or eight weeks, there is good reason for sanguine expectations when the demand sets in again, as it must within a very short time. It is really surprising that with such an immense production, and with more or less suspension of work during the holidays, stocks do not appear to have accumulated. At any rate, there is no pressure to sell, and many of the larger companies claim that they are actually short of Iron, so that it may be taken for granted, that there is no cause for uneasiness as regards an over-supply. On the contrary, with anything approaching the demand which many well informed parties think we are entitled to, another upward movement in prices would not be at all surprising. Of course it is all a matter of opinion as yet, but it must be conceded that those who were expecting a sharp reaction have been less successful in their forecasts than those who took the opposite side, and from this on every day is likely to strengthen holders in their position. The United States is a big country, however, and the time has passed for Philadelphia or any other city to absolutely control the course of the entire market. But for this section of the country it is now tolerably clear that unless consumers are swamped by shipments from the South or West there is very little danger of any material change from the quotations now current. Hence, attention is centered on the points we have mentioned. As they go, we must go. We can carry our own share of the burden, but are not in condition to carry the surplus of the entire country. At the moment things seem to be fairly well adjusted, and it is not unlikely that a fresh buying movement will begin soon on the basis of to-day's prices, which may be given as \$17.50 @ \$18, delivered, for Gray Forge, \$19 for No. 2 Foundry and \$20 for No. 1. Choice brands command 50¢ to \$1 more money, but a fair average of the market would be as we have stated for such quantities as consumers are inclined to take. Large lots if pressed for sale would prob-

ably have to be at lower figures, but there is no pressure of that kind, so far as we have been able to discover.

Bessemer Iron.—The market is dull, with no special urgency either to buy or sell. Sellers quote \$22, at furnace, but to the right kind of buyers it is thought that bids of \$21.50 would not wait long for acceptance.

Speigeleisen—Buyers and sellers are a good way apart in their views. Bids of \$37, c.i.f., duty paid, for 20% have been made, although sellers quote \$39; but it is not unlikely that a medium figure would be accepted on a firm offer. Ferro is quoted \$99 for 100% and about \$82.50 @ \$85 for 70%, according to delivery.

Billets.—The demand is fair and as mills have a great many orders on hand prices are maintained at about \$38 for Billets and \$37 @ \$37.50 for Nail Slabs, delivered in consumers' yards.

Blooms.—Prices are steady at about the figures named below: Charcoal at from \$54 to \$56 $\frac{1}{2}$ Bloom ton, delivered; Run-out Anthracite at \$44 @ \$45, and Scrap Blooms at \$35 @ \$36, but there is not much demand.

Steel Rails.—The demand is a little slow, but prices are maintained at \$35, at mill, as a minimum. There are bids at \$34.50 for large lots, but as yet no one has been found willing to accept that figure. Small lots sell at \$35.50, but it cannot be said that there is much life in the market, or anything to indicate any special movement in the immediate future. Mills are all busy, however, the demand for Steel in other forms being an important item.

Muck Bars.—Buyers have been doing their utmost to get prices down to about \$33, delivered, but holders have maintained that figure f.o.b. cars at their mills. There is a fair inquiry, but the supply is not large, so that prices are steady at the figure above named.

Bar Iron.—The market has been extremely dull, but prices hold remarkably well considering the slackness of demand. Mills appear to be busy, but there is a good deal of complaint in regard to the delay in specifying. In some cases it is said that 1.9¢ has been quoted for immediate specifications, but as a rule 1.95¢ is a firm quotation for good iron. The dullness is not likely to be thoroughly broken until these old contracts are out of the way, as iron of this class competes for every new order that comes on the market, so that it is impossible to maintain uniform prices. There has been some inquiry for Car Iron, for which it is said 1.85¢ has been quoted f.o.b. cars at mills in the interior. It may be well to remark in this connection that parties supposed to be among the shrewdest in the trade express the opinion that a decided revival of activity is likely to be seen inside of 60 days. A member of one of the leading firms in this city has just returned from a trip through Pennsylvania and Ohio, and says he found prices were equally as firm West as in Philadelphia, and although not a seller of iron, he believes in a two tenths rise within the next 60 days.

Skelp Iron.—Dull and at unchanged prices, say, 1.95¢ to 2¢ for Grooved, and 2.10¢ @ 2.15¢ for Sheared. Buyers decline to pay these prices at present, and claim to be doing $\frac{1}{16}$ ¢ to $\frac{1}{8}$ ¢ better on Sheared.

Plates.—The market has been very dull since our last report, and only small orders have been secured at quoted rates. On large lots concessions of more or less importance could be had, but in the absence of any such demand prices are nominally unchanged. The mills are still pretty well supplied with orders and are mostly running full time, but there is an increasing

desire to secure new business, hence the weakness in prices. Nominal quotations are about as follows:

	Iron.	Steel.
Tank.....	2.30 @ 2.35¢	2.65¢ @ 2.75
Shell.....	2.65¢	3.00¢ @ 3.1
Flange.....	3.25¢	3.25¢ @ 3.35
Fire-Box.....	3.75¢	3.75¢ @ 4.25
Angles.....	2.30¢	2.75¢ @

Structural Material.—There is no scarcity of work at present, but new business comes in very slowly. The leading concerns have orders enough to give them full employment for some time to come, so that there is no immediate urgency for new contracts. Prospects are said to be good, and the feeling is one of great confidence as the ultimate outcome. Prices are steady and for carload lots as follows: About 2.35¢ @ 2.40¢, delivered, for Iron Bridge Plate; 2.30¢ @ 2.35¢ for Angles, with 20¢ @ 25¢ more for the same in Steel. Tees, 2.8¢ @ 2.9¢; Beams and Channels, 3.1¢ for either Iron or Steel

Sheet Iron.—The demand is all that can be desired, and mills are fully employed in meeting the calls made on them. Prices are steady, and for carload lots about as follows:

Best Refined, Nos. 14 to 20.....	3.10¢
Best Refined, Nos. 21 to 24.....	3.30¢
Best Refined, Nos. 25 to 26.....	3.50¢
Best Refined, No. 27.....	3.60¢
Best Refined No. 28.....	3.70¢

Common, $\frac{1}{8}$ ¢ less than the above.

Best Soft Steel, Nos. 14 to 20.....	3.1¢
Best Soft Steel, Nos. 21 to 24.....	3.3¢
Best Soft Steel, Nos. 25 to 26.....	3.5¢
Best Soft Steel, No. 27.....	3.6¢
Best Bloom Sheets, 1-10¢ extra over the above prices.	

Best Bloom, Galvanized, discount.....60%
Common, discount.....62½%

Old Rails.—Actual sales are few and far between in this market, but lots are sold from interior points at from \$28 to \$28.50, delivered in consumers' yards. A lot of several thousand tons is held in store here for about \$30, but the figure is considered too high, although it is claimed that \$29 would be paid, as they are specially desirable for certain purposes.

Scrap Iron.—There is a good demand, and sales are easily made at quoted rates for desirable selections. Sales at about the following figures: No. 1 Wrought, \$24.50 @ \$25, Philadelphia, or for deliveries at mills in the interior \$26 @ \$26.50; \$16.50 @ \$17 for best Machinery Scrap, \$15 @ \$15.50 for ordinary, \$16.50 @ \$17 for Wrought Turnings, \$11 @ \$11.50 for Cast Borings, and \$28 @ \$30 for Old Fish-Plates, and \$18 @ \$19 for Old Car-Wheels. Sales at \$20 at interior point.

Nails.—There is not much movement in Nails at present, although prices are steady at about \$2.10 for carload lots and \$2.20 from store. An improving demand is looked for in the near future, and in view of higher cost some are inclined to expect higher prices before the spring trade sets in.

Wrought-Iron Pipe.—The demand is all that can be desired and prices are steady. Discounts are quoted as follows: Butt-Welded Black, 47½%; Butt-Welded Galvanized, 40%; Lap-Welded Galvanized, 47½%; Lap-Welded Black, 60%; Boiler Tubes, 1½ inches and smaller, 45%; Boiler Tubes, 2 to 4 inches, 50%; Boiler Tubes, 4½ inches and larger, 52½%; Oil Well Casting, 52½%.

Louisville.

LOUISVILLE, KY., February 3, 1890.

Pig Iron.—While there has been no special buying during the past week, there are evidences that the market may change very shortly, and there are no signs of weakness manifest at this point. Furnaces are in a position to hold off from selling, and believe the market will be

stronger. Inquiries are becoming more numerous, and the situation is very much improved.

Southern Coke, No. 1 Foundry (new classification).....	\$18.75 @ \$19.25
Southern Coke, No. 2 Foundry (new classification).....	13.25 @ 18.75
Southern Coke, No. 3 Foundry (new classification).....	17.75 @ 18.25
Gray Forge.....	17.25 @ 17.75
White and Mottled, different grades.....	16.00 @ 17.00
Silver Gray, different grades.....	16.75 @ 17.75
Southern Charcoal, No. 1 Foundry.....	18.75 @ 19.75
Southern Charcoal, No. 1 Mill.....	17.50 @ 18.00
Southern Car-Wheel, standard brands.....	23.50 @ 24.50
Southern Car-Wheel, other brands.....	19.25 @ 21.75
Hanging Rock Coke, No. 1 Foundry.....	18.75 @ 19.25
Hanging Rock Charcoal, No. 1 Foundry.....	22.00 @ 22.50
Hanging Rock, Cold Blast.....	24.00 @ 26.00

Cincinnati.

Office of *The Iron Age*, Fourth and Main Sts. (CINCINNATI, February 3, 1890.)

Pig Iron.—Dullness is the one prominent feature in the local market for Pig Iron. Southern furnaces have not weakened and buyers have continued to hold aloof. Whatever the future may have in store is not reflected in the present. Small sales of Northern Iron have been made on the basis of quotations and possibly a few hundred tons of Southern Iron, all told, have been disposed of at or near the limit prices, but such rates are paid only under protest. The market seems to rest upon the point of endurance of buyer or seller. Should consumers be fortunate enough to make new contracts at remunerative prices it is possible that to cover such less attention would be paid to price, unless there was a strong downward tendency. But general business is less active and in some lines there is not only a less confident feeling, but even discouragement. There is an unwholesome amount of idle money seeking investment, which fosters speculation. Holders may be benefited by this fact in being able to hold stocks, but if buyers are not equally benefited it will profit producers nothing in the long run. Not a transaction has been made in the local market during the week worthy of special comment, and not a change in prices has been made to the advantage of either buyer or seller, and each is equally disappointed, without evidence of impatience. The following are the approximate rates current here at the close, cash, f.o.b. Cincinnati, but of course it is understood that several of the largest Southern furnaces continue to demand 45¢ more than outside quotations:

Foundry.

Southern Coke, No. 1.....	\$18.50 @ \$19.00
Southern Coke, No. 2.....	18.00 @ 18.50
Southern Coke, No. 3.....	17.50 @ 18.00
Ohio Soft Stone Coal, No. 1.....	18.50 @ 19.00
Ohio Soft Stone Coal, No. 2.....	17.50 @ 18.50
Mahoning and Shenango Valley.....	18.00 @ 18.50
Hanging Rock Charcoal, No. 1.....	21.00 @ 23.00
Hanging Rock Charcoal, No. 2.....	20.00 @ 22.00
Tennessee and Alabama Charcoal, No. 1.....	19.50 @ 20.00
Tennessee and Alabama Charcoal, No. 2.....	18.50 @ 19.00

Forge.

Gray Forge.....	17.00 @ 17.50
Mottled Neutral Coke.....	16.75 @ 17.25

Car-Wheel and Malleable Irons.

Southern Car-Wheel.....	24.00 @ 24.50
Hanging Rock, Cold Blast.....	22.00 @ 25.00
Lake Superior Car-Wheel and Malleable.....	23.00 @ 25.00

Manufactured Iron.—Neither especially favorable nor discouraging reports are received from the mills; there is a fair volume of business and a steady and firm feeling exists, without important change in prices.

Nails.—There has been little demand for Iron Nails, which have been freely offered and are nominal, but there has been a fair demand for Steel, which have ruled strong. Steel Nails, 12d to 40d, sell at \$2.70 @ \$2.75 $\frac{1}{2}$ keg, with 10¢ rebate in car lots, at mill; 50d to 60d at 25¢; 10d, 10¢; 8d and 9d, 25¢; 6d and 7d, 40¢; 4d

and 5d, 60¢; 3d, \$1, and 2d, \$1.50 per keg more; Steel Wire Nails sell at \$3.10 @ \$3.20 for 60d.

Old Material.—There has been but little inquiry for either Rails or Wheels and prices have been nominally unchanged. Old Rails are quotable at \$26.50 @ \$27.50, according to location, and Old Wheels are nominally quotable at \$19 @ \$19.50, cash.

Cleveland.

CLEVELAND, February 3, 1890.

Iron Ore.—The importance of the transactions now taking place is partially eclipsed by the pending negotiations for many of the mining properties themselves. The probability of output of ore in 1890 of nearly 9,000,000 has done more than to simply encourage furnacemen to make their purchases earlier than ever before. It has called the attention of speculative capitalists to the undeveloped Ore districts adjoining the mines now in operation as well as to the probable wisdom of buying stock even at full quotations in the famous mines whose outputs are increasing from season to season. The Schlesinger syndicate is reaching out right and left for good investments, and is about to acquire among other properties, Section 33, in the Gogebic Range, for \$300,000. The output is a Bessemer Hematite assaying only .040 in phosphorus. Other even more important sales are pending and can be made public soon. The Ore market itself is not inactive. Sales of round lots of non-Bessemer are reported at prices ranging from \$4.50 to \$5, f.o.b., vessels, Cleveland. It is probable that nearly 3,000,000 tons of non-Bessemer Ore have already been ordered as against sales of Bessemer believed to aggregate 4,750,000 tons. Considerable has been done during the week in the way of new vessel charters at \$1.10 from Escanaba; \$1.25 from Marquette, and \$1.35 from Ashland and Two Harbors to Ohio ports.

Pig Iron.—The market is extremely quiet, although prices are apparently as rigid as ever, and iron men look upon the situation as favorable in the extreme. It was feared that the rapid increase in quotations recently characterizing the market from week to week would not be checked until a disastrous reaction had followed. The climax seems, however, to have reached at the proper time and the existing quietness is a condition of which few complain. No very considerable lots of Iron can be had at prices below regular quotations; nearly all the furnaces are over stocked with orders and a new buying movement will not, it is believed, be delayed longer than the middle of February. Sales of Foundry Iron at \$19.80, cash, at the furnace are reported.

Manufactured Iron.—Bar Iron at 1.90¢ @ 1.95¢ is in excellent demand and 2¢ is said to have been paid for several 1000-ton lots. Sheets are as scarce and as high as ever.

Old Rails.—Sales are believed to have occurred at \$27 @ \$27.25, although prices are ostensibly \$27.50 @ \$28.

St. Louis.

OFFICE OF The Iron Age, 214 N. Sixth st.,
ST. LOUIS, February 3, 1890.

Pig Iron.—A careful examination fails to reveal anything of an interesting nature. There is absolutely no trade doing, and agents are kept employed replying to inquiries which are regularly received, many of which bear the impress of future business. The market in its present condition is very difficult to report, the least said just now is likely to prove the better course. It is admitted that the market is in a very sensitive con-

dition, and is held in the balance by both buyers and sellers remaining inactive. It is pretty well understood that furnace men are sold up some time ahead, and those that are not are in a position to hold their product until such time as they see fit to realize. Under these circumstances the outlook is regarded with some degree of brightness, and with anything like a fair demand a continuance of present prices seems assured, with a possibility of higher figures in the near future. In the absence of sales prices are nominally as follows for cash, f.o.b. St. Louis:

Southern Coke, No. 1 Foundry,	\$19.50 @	\$20.00
Southern Coke, No. 2 Foundry,	18.75 @	19.25
Southern Coke, No. 3 Foundry,	18.25 @	18.75
Gray Forge.....	17.75 @	18.25
Ohio Softeners.....	20.00 @	21.00
Lake Superior Charcoal.....	24.00 @	24.50

Missouri.

Charcoal Foundry, No. 1.....	21.00 @	21.50
Charcoal Foundry, No. 2 .. .	20.25 @	20.75

Tennessee.

Charcoal Foundry, No. 1.....	20.00 @	20.50
Charcoal Foundry, No. 2.....	19.25 @	19.75

Connellsville Coke, f.o.b. East St. Louis, \$5.25; St. Louis, \$5.40.

Bar Iron.—There is a continued good degree of activity and prices are firmly adhered to as follows: Small lots from store, 2.15¢; carload lots, 2¢.

Barb Wire.—Trade keeps up well for the season and some good shipments have been made since our last report. On account of the advance in raw material mills were compelled to issue a new card rate, which went into effect February 1. The following are the new prices, which show an advance of 10¢ per cwt. Painted, 3.45¢; Galvanized, 4.05¢. Carload lots, 10¢ per 100 lb less than above prices.

Pittsburgh.

Office of The Iron Age, Hamilton Building,
PITTSBURGH, February 4, 1890.

There is a continued degree of activity in finished products, but the raw material has been in an offish and unsettled condition for some time past, caused by consumers holding off, but the indications at the present time are that there will soon be an improved demand, and just as soon as it sets in a stiffer market is pretty certain to follow. The situation is almost every respect is very favorable for a big trade in Iron and Steel this year; indeed, the outlook at present warrants the prediction that so far as relates to these important interests the business of 1890 will be in excess of that of 1889.

Pig Iron.—The quietude for several weeks past continues, but there is an increasing inquiry; consumers are commencing to investigate the market, and it is evident that some of them will be forced to buy before long. Some mills are getting low in stock, having been out of the market since December, and just as soon as they do a stiffening up is looked for. Furnacemen generally are indifferent sellers; they say that there is but little margin at present prices, and with no prospect whatever of cheaper Ores and a probability of the price of Coke being advanced within the next week or two, those furnacemen who are in position to sell do not feel like doing so, excepting possibly some small lots for immediate delivery; they went to keep themselves in condition so that when there is an improvement they will be able to take advantage of the same. Prices have gone off somewhat during the past week; Mill Irons to the extent of 25¢ and Bessemer 50¢. It is said that there is a scheme being carried out to bear the market for Bessemer; that after it has been forced down as low as it can be large contracts will be made and the parties who are now bearing will then take the other side. Some of our furnacemen are refusing to sell to speculators. The recent

break in the market for Bessemer was caused by the unloading of speculators. Bessemer has gone o. from \$1.25 to \$1.50 per ton as compared with the highest point. It has been offered the past few days at \$22.50 @ \$22.75, cash, against sales a few weeks ago at \$24. Notwithstanding the present weakness, there are those who believe that when the market takes the turn in the opposite direction it will go higher than ever; some of the knowing ones predict that it will go to \$30 before the close of the present year. There has been increased output recently of Bessemer, a number of furnaces having changed from Forge over to Bessemer, as the latter as it now stands pays the furnaceman better than the former, and this increased production is being used just now with good effect by those who are engaged in bearing the market. We quote prices as follows:

Neutral Gray Forge.....	\$17.75 @	\$18.25, cash.
White and Mottled.....	16.75 @	17.25, "
All Ore Mill.....	19.00 @	19.50, "
No. 1 Foundry.....	20.00 @	20.50, "
No. 2 Foundry.....	19.00 @	19.50, "
No. 2 Charcoal Foundry.....	21.50 @	22.50, "
No. 1 Charcoal Foundry.....	24.00 @	25.00, "
Cold Blast Charcoal.....	25.00 @	30.00, "
Bessemer Iron.....	22.50 @	23.00, "

There have been no sales of Forge Irons reported above \$18, cash, for some days, and very good brands are now to be obtained at that price.

Muck Bar.—Continues very dull, but it is expected there will be an improved demand within the next few weeks, as some of the largest buyers are reported as being supplied with large orders for finished product, and will want some Muck before long. We continue to quote at \$30 @ \$30.50, cash, but very few sales at quotation. Some holders are refusing to sell at present prices, but buyers have no trouble in supplying themselves at prices quoted.

Manganese.—Domestic 80 % Ferro is quoted at \$102 @ \$103. Sale of foreign reported at \$99, at seaboard. The inquiry appears to be chiefly for small lots, indicating that buyers are not disposed to anticipate future wants to any great extent, although some of the best informed do not look for much lower prices, in consequence of the scarcity of Manganese Ores.

Manufactured Iron.—There is an increasing inquiry, and it is evident that there will be increased activity within the next week or two. In addition to the regular merchant trade there will be a big demand for specialties; the railroads will be large buyers before long, and then a big demand from other sources is confidently looked for. Prices remain about as last quoted: Bars, 1.90¢ @ 2¢; Plate Iron, 2.50¢ @ 2.60¢; No. 24 Sheet, \$3 @ 3.10¢; Skelp Iron, 1.90¢ @ 1.95¢ for Grooved and 2.20¢ @ 2.25¢ for Sheared.

Nails.—Trade in this market continues light, but an improved demand is looked for this month. Prices remain unchanged. There is a suspicion that there is some cutting being done on the quiet. Manufacturers here say that in answer to inquiries they quote full card rates, but that is the last they hear from the parties asking for prices, and consequently are led to suspect that the parties in question are able to buy below the card elsewhere. This looks a little suspicious. We continue to quote Steel Cut Nails at \$2.50, 60 days, 2 % off in carload lots and upward, and Wire Nails at \$2.85 @ \$2.90 rates.

Structural Iron.—The outlook never was better; many large new buildings are contemplated, all of which will require large quantities of Structural Iron, and those making a specialty of the same look for an active demand all this year, with every indication that their expectations will be realized. Prices remain as last quoted: Angles, 2.45¢; Tees, 2.95¢; Channels, 3.10¢; Universal Mill Plates, Iron, 2.55¢.

Wrought-Iron Pipe.—The demand for Pipe is remarkably brisk for this season of the year. All the mills reported busy, and likely to be from now on. The winter has been so open that the work of laying Pipe, both by oil and natural gas companies, has not been interfered with much, and largely accounts for the activity in the demand for Pipe to which reference has been made. Prices are reported at the recent advance: Discounts On Black Butt-Welded, 47½%; on Galvanized do., 40%; on Black Lap-Welded Pipe, 60%; on Galvanized do., 47½%; Boiler Tubes, 1½-inch and smaller, 45%; 2 to 4 inch, 50%; 4-inch and larger, 52½%.

Steel Plates.—There is a continued good demand; mills are fully employed and prices are firm as quoted: Fire-Box, 4½¢ @ 4½¢; Flange, 3½¢; Shell, 3½¢; Tank, 2.90¢.

Wire Rods.—There is a continued fair demand, with no quotable change in prices. Domestic, \$51.50 @ \$52.50 ½ ton.

Merchant Steel.—There is no change to note in prices; demand keeps up and mills have about all they can do. Tool Steel 5¢ and upward, as to quality; Crucible Spring Steel, 4¢; Crucible Machinery, 5¢; Open-Hearth Steel, 2½¢ @ 3¢; Bessemer Machinery, 2½¢; Tire Steel, 2½¢.

Old Rails.—There is very little call for Old Iron Rails in this market; the only sale reported was a lot of 500 tons at \$28.50. As stated in our last report, the large consumers here are out of the market; they appear to have about all they want for the present, and then the low price of Muck Bar is having a bad effect on the market for Rails, as the former at present prices is cheaper to the consumer than the latter. Moreover, the weather has been favorable to the taking up of Rails all winter. Old Steel Rails continue scarce and in demand, and prices are firm but unchanged at \$24 @ \$24.50.

Steel Rails.—Several small sales have been made during the past week at \$36, cash, at mill, but it is intimated that a desirable order could be placed below the price above quoted.

Billets and Blooms.—There is still considerable inquiry for Bessemer Steel Billets, but the market is easier, in sympathy with Bessemer Pig. We now quote at \$36 @ \$36.50, cash, on cars at maker's works. Several sales have been made here of late to Eastern buyers.

Railway Track Supplies.—The demand for Railway Spikes continues light, while prices remain unchanged at \$2.15, 30 days, on cars at works here, and \$2.25 delivered at Chicago and St. Louis; Iron Splice Bars 2.10¢ @ 2.20¢; Track Bolts, 3.10¢ with Square and 3.20¢ with Hexagon Nuts.

Old Material.—Dealers continue to report a very good demand, but there has been no recent change in prices. No. 1 Wrought Railway Shop Scrap, \$23 @ \$23.50, net ton; No. 1 Wrought Turnings, \$15.50 @ \$16; Car Axles, \$29 @ \$30; Cast Scrap, \$16.50, gross; Old Car-Wheels \$20.50 @ \$21; Steel Bloom and Rail Ends, \$25.50 @ \$26; Crucible Scrap Steel, \$29 @ \$30.

Detroit.

WILLIAM F. JARVIS & Co., under date of February 3, 1890, say: The situation of the general market is in no way changed from our last report. There have been scarcely any operations whatever of any magnitude. To be sure the carload trade and a few orders for lots of 100 to 200 tons of Charcoal Iron have been placed at ruling figures, but nothing has occurred in any way to disturb or change the state of the market when last reported by us. It is generally thought by makers of pig metal

that the present lull will be but a temporary matter, and that it will be succeeded by a strong market, which will hold for the balance of the year; respecting the course of Lake Superior charcoal this seems more than probable, owing to the scarcity of stocks in both makers and consumers' hands. The Northern Coke Iron makers seem to feel that furnace coke will rule higher after the meeting at Pittsburgh on the 10th, which will have the effect of strengthening their prices. We quote the market as follows:

Lake Superior Charcoal, all numbers	\$22.50 @ \$23.50
Lake Superior Coke Bessemer	23.50 @ 24.50
Katabdin (Maine Charcoal)	26.00 @ 26.50
Lake Superior Coke Foundry, all ore	21.00 @ 22.00
Lake Superior Coke Foundry, cinder mixed	20.00 @ 20.50
Standard Ohio Blackband	20.00 @ 21.00
Southern No. 1	20.50 @ 21.00
Southern Gray Forge	18.50 @ 19.00
Jackson County (Ohio) Silvery	19.50 @ 20.00
Old Car-Wheels (nominal)	21.00 @ 22.00

Chattanooga.

Office of The Iron Age, Carter and 9th Sts., CHATTANOOGA, February 3, 1890.

Pig Iron.—Some inquiries and personal interviews with producers in our Birmingham district develop the fact that some large round lots that were bought by speculators during the past month or two are now being urged forward to places of destination. What prices these have been sold at of course it is impossible to state, but it is supposed that the sales were made on conceded prices, as it is but natural that owners of iron who have bought with a view of higher prices in the future would now desire to unload at the best prices they can get. The principals of some of these transactions will no doubt meet with some loss. So far as the furnaces are concerned no concessions have been made. They sold quite largely ahead, and at the present there is no object to be gained in making lower prices for distant delivery. None of our people have yet manifested any degree of nervousness touching the future, as there appears to be a general opinion that prices during the entire year will vary but little. Taking the question of capacity and consumption into consideration, if there is any difference either way it cannot now be observed. This being the case there can be no good reason why prices should vary much during the present year, and the most far-seeing can as yet see nothing in the future to indicate any change in the prosperous condition of business throughout the country.

New York.

Office of The Iron Age, 65 and 68 Duane street, NEW YORK, February 5, 1890.

American Pig.—Business has been light and the market is dull. Offerings of Iron continue, and while it is claimed that they come from second hands, there are indications that in some instances they really emanate from producers themselves. The freights on Southern Pig from Alabama have been advanced, being now \$4.36 to New York, against \$4.11, while the freight to Boston and Providence is now \$4.60. We quote No. 1 Foundry at \$19.50 @ \$20 and No. 2 \$18.50 @ \$19, and Gray Forge \$17.50 @ \$18, all at tidewater.

Spiegeleisen and Ferromanganese.—The market is dull and easier. Spiegeleisen for delivery in June and later has been offered this week at \$37, without any transactions being reported. Ferromanganese is weaker for forward delivery, it having been offered during the week at \$92.50. There has been a moderate amount of business. Importers note that there has been some trouble in the quality of Spiegeleisen shipped by foreign makers and there have been some rejections. It is stated that the foreign makers have been

forced by the scarcity in coke to use fuel from other than their usual sources of supply and that this is the cause of the trouble.

Manufactured Iron and Steel.—We quote Bars 1.9¢ @ 2¢ for Refined; Iron Universal Mill Plates, 2.30¢ @ 2.40¢; Angles, 2.30¢ @ 2.40¢; Tees, 2.7¢ @ 2.8¢, and Beams and Channels, 3.1¢, on dock.

Merchant Steel.—We quote Ordinary Hot Finish Round Shafting, 2.20¢ @ 2.30¢; small sizes do., 2.35¢ @ 2.40¢; Toe Calk, 2.50¢ @ 2.60¢, and Tire, 2.35¢ @ 2.45¢, at mill.

Steel Rails.—We have been unable to trace to any authoritative source the reports that the market is decidedly weaker. The volume of business transacted by the Eastern mills still remains moderate, but the range of \$35 @ \$36 still holds good. Among the sales made by Eastern mills we note one lot of 5000 tons for a Southern road and one lot of 3000 tons for the West Shore. The most interesting transaction of the week has been the sale by the Chicago mills of a block of 11,250 tons of 35 lb Rails to the Alberta Coal Railway, of Canada, at private terms. There is a movement now on foot which may result in materially strengthening the position of the Rail mills and give new tone to the market. There has been an advance in freight rates on Steel Rails from Eastern mills.

Billets.—In the East there have been a number of small sales of small sizes and special specifications at \$42 @ \$43. Lately a small lot of Domestic Basic Open-Hearth Billets sold as high as \$50 at mill.

Wire Rods.—There is a good demand in the Eastern market, a number of sales of blocks of 500 and 1000 tons having been made. In one instance \$56.50 was paid by an Eastern consumer, the seller being an Eastern mill.

Rail Fastenings.—The market is very quiet and not so firm. Steel and Iron Angle Bars are being offered at 2.10¢, delivered. Spikes remain nominally \$2.20 @ \$2.25.

Old Rails.—Offerings of foreign Double Heads during the week have been a disturbing factor. They have been offered at \$27, ex-ship. One lot of 1800 tons is now afloat from India, but it is a question whether it will be sold in this country or will be forwarded to England. We hear of no transactions.

Scrap.—The volume of business is very small. Holders ask \$23.50 @ \$24 for No. 1 Wrought, in yard, which consumers are not willing to pay.

Financial.

The sensation of the week, scarcely felt, however, outside of financial circles, was the temporary wrecking of the Sixth National Bank by President Chas. H. Leland, as the consequence of the transfer of a majority of the stock of the institution, of which he was the owner, to parties comparatively unknown, if not of positively questionable standing. Suspicion of wrong-doing was first aroused by an attempt of Geo. H. Pell, a broker, to privately dispose of valuable securities abstracted from the bank's vaults. The prompt interposition of United States Bank Examiner Hepburn, on application of the Clearing House, which had been notified by Cashier Colston with commendable promptness of the dangerous situation, alone averted a worse catastrophe. Peter J. Claassen, the so-called president-elect of the bank, together with Mr. Pell, were held under heavy bail, charged with a misappropriation of funds. Two other banks, the Equitable and Lenox Hill, being deeply involved by an interchange of checks, popularly known as "kit-

ing," were simultaneously closed by New York State Bank Superintendent Preston. James A. Simmons, of dredging notoriety, was supposed to head the syndicate interested in the three banks involved. On Tuesday morning the Sixth National again opened for business, Mr. Leland having recovered his stock and the *status quo* having been restored in other respects so far as was possible. The total payments by Mr. Leland in reaching this end are calculated at \$630,000, or about the same that he received for his stock. Charles G. Landon, a merchant, is supposed to be practically the head of the institution. Upon the report of Examiner Hepburn that the bank was perfectly solvent, the Comptroller ordered its surrender to its officers. The new Board of Directors are: Charles H. Leland, Joseph Park, of Park & Tilford; W. J. Quinlan, Jr., cashier of the Chemical National Bank; Charles G. Landon, a merchant, and Fred. D. Tappen, President of the Gallatin Bank. The Equitable resumed on Tuesday, but the affairs of the Lenox Hill will not be so easily arranged. Just how Simmons comes out of the deal does not yet appear. Some of his property was attached. One obvious teaching of the events of the last few days is the impolicy of holding a controlling share of bank stock in the hands of any single officer. Furthermore, those who intrust money to the keeping of bank officers should be recognized in important transactions affecting their interests.

The McKinley bill to simplify the laws in relation to the collectors of revenues, commonly known as the Administrative bill or the Undervaluations bill, which passed the House of Representatives January 25 last, according to its terms will take effect from the day of its passage. Whether its provisions will be held to apply only to goods imported after the bill is signed, or to goods *en voyage*, or to goods not yet entered, or to invoices not yet liquidated, are questions which will be determined hereafter. There is little expectation that the Senate Finance Committee will make any material change in the bill, since it is a measure which was originally drawn by that committee. Congress shows no disposition to repeal the Interstate Commerce law.

On the Stock Exchange the upward movement was checked by the withdrawal of the Union Pacific and the Chicago and Northwest from the Interstate Railway Association; and, secondly, by the closing of the Sixth National and two allied banks. The leading stock in the week's transactions was that of the Louisville and Nashville road. The announcement that the new stock, amounting to \$13,000,000, had all been taken at 85½ was the beginning of the strength and activity, which continued until the stock had reached the highest point attained since 1882. The latter part of the week showed some reaction. On Saturday the favorable showing of the Lackawanna and Delaware and Hudson in the last year assisted the coalers. On Monday prices were only fairly steady, with Western stocks the features.

On Tuesday there was a sharp spurt in Philadelphia and Reading, on the reported large accumulation of the shares by a strong syndicate antagonistic to the present management. Tennessee Coal and Iron broke on selling attributed to the emphatic denial made by John H. Inman, the former president, of all the charges which the new management preferred against him.

United States bonds were weak. Quotations as follows:

U. S. 4½s, 1891, registered.....	103½
U. S. 4½s, 1891, coupon.....	104½
U. S. 4s, 1897, registered.....	123
U. S. 4s, 1897, coupon.....	124
U. S. currency 6s, 1895.....	116

The weekly bank return showed a loss of \$763,200 in surplus reserve, which now stands at \$14,268,450. Owing to the influx of currency from the West and South,

an increase instead of a decrease had been expected. The significant features of the statement were an expansion of nearly \$4,000,000 in loans and an increase of over \$5,200,000 in deposit liabilities. A temporary stringency on Friday was caused by the calling in of loans to meet demands February 1, among them the payment of \$5,000,000 7% bonds by the New Jersey Central. Time money was in good supply, with the demand less urgent. On first-class collateral the rate for 30 to 90 days was 3½% and for four to six months 4% to 5%. There was an active demand for commercial paper and the supply was good.

Sterling exchange is quiet, but firm. Posted rates are about \$4.84 @ \$4.88½. Since January 1 the advance has been 4¢, supposed to be due to money pressure in London and a considerable return of securities in settlement of merchandise accounts. The Bank of England has commenced the issue of £1 notes.

In regard to a rumored combination against President Corbin, of the Philadelphia and Reading, designed to affect his influence in that corporation, a report from Philadelphia says several American millionaires, supported by European banking houses, have already obtained possession of over 400,000 shares of the capital stock, more than a majority. In this new syndicate, so it is stated, are Postmaster-General John Wanamaker, Thomas Dolan, the millionaire manufacturer; President Filler, of the First National Bank of Philadelphia; J. Worden, the Standard Oil magnate, and the Elkins-Widener crowd of capitalists, led by W. W. Gibbs. Reports of coming conferences, much litigation, &c., must be received with allowance.

The general merchandise markets are slow. Breadstuffs are weak. Wheat is quiet, with little export business. Corn is in good supply and a trifle lower. From Baltimore grain shipments are the heaviest of the season. Spot cotton has small sales, with steady prices. In coffee there is an indifferent feeling. The cottonseed oil situation becomes brighter on the appearance of buying orders from the Mediterranean, where a substantial advance has occurred in the price of olive oil. Shipments of hog products are free. Among dry goods jobbers there was a better feeling as to cotton and woolen goods. Low-grade cottons tend steadily toward a firmer position, on account of the raw material, and numerous finer goods are sold ahead. The United Kingdom and Continent steamship lines have their freight room pretty well engaged to the third week in this month.

As shown by a compilation in the State Banking Department the total amount due depositors from the 24 savings banks and institutions in New York City on December 31 last was \$307,773,150.24.

A government decree revising the banking law of Brazil has just been issued. The Republic will be divided into four banking districts and the total issue of paper currency will be limited to 200,000,000 milreis—about \$108,000,000.

The actual amount of import duties collected at Vera Cruz for the second half of the year was \$6,064,176, against \$5,681,996 last year, showing an increase of \$382,180. With reference to the amount of foreign capital invested in Mexico in 1889 the *Mexican Financier* is able to give, approximately, the totals in Mexican currency. The division by nationalities is as follows: English, \$75,000,000; American, \$32,000,000; German and other nationalities, \$13,000,000; total, \$120,000,000 silver.

Exports from this port for the week were valued at \$7,164,000, and since January 1 \$32,754,000, against \$34,836,000 for the same time last year. Imports were \$9,918,500, and since January 1 \$46,587,000, a decrease of \$3,500,000 compared with last year.

Metal Market.

Copper.—At the time of our last week's report the London quotation for spot Copper was £49 and for futures £49. 10/, sales aggregating 1250 tons. To-day the respective quotations are £48. 17/6 and £49. 5/. Here the situation is unaltered and featureless at nominally 14½¢ Lake and 13¢ @ 13½¢ casting brands. Some Chilean Copper-mine owners, as per latest advices from Valparaiso, are selling out to Europeans. Thus the Challacollo Copper mine was sold to a Bremen banking concern for \$1,200,000; the great Guanaco to a Parisian banking house for \$3,600,000; the Inesperada was sold for £45,000, and for the Estrella de Venus and Chilena the lump sum of £180,000 is offered.

Tin.—Last week's London quotation was £94. 12/6, spot, and £95. 10/, futures, sales for the week figuring up 950 tons; to-day the respective quotations are £93. 15/ and £94. 12/6. A little corner had been engineered here and in London, and toward the close of last month London was pushed to £96, and we, here, to 21.60¢; the screw being loosened the break occurred, the total corner sales in London and here summing up together 600 tons. The spot quotation to-day is 20½¢.

Tin Plates.—In view of the easier tendency in the English market buyers have withdrawn for the moment except in a small way to meet current requirements. We quote at the close, per box: Siemens-Martin Steel, Charcoal finish, \$5.50 @ \$6; Coke finish, \$5.20 @ \$5.25; Coke Tins, Penlan grade, \$4.75 @ \$4.80; J. B. grade, \$4.85 @ \$4.90, and Wasters, \$4.65.

Lead.—Sales in the open market have not exceeded 400 tons at 3.80¢ @ 3.85¢, and the metal closes firm at these figures, while St. Louis is well sustained at 3.60¢ and Chicago at 3.65¢. Germany imported during the first eleven months of 1889 86,329 metrical cwt. of 100 kg., against 68,790 in 1888, and exported 291,329, against 318,112.

Spelter.—Has been easier, 100 tons selling on the spot at from 5.35¢ down to 5.32½¢. The West has commenced offering at New York for forward delivery more freely, at figures most of them slightly higher than those above. March-April is offered at 5.35¢, while the bids thereon are 5.25¢ @ 5.30¢. The advance in Germany in all last year was 7 marks @ 50 kg., the closing quotations of the year being for Godulla, 23 65, and for W. H., 24 marks. At Breslau there are 23 smelting works in operation. Silesian is to-day down to £23 in London, and to nominally 7¢ @ 7½¢ here.

Antimony.—has remained steady at 31¢ Cooksons's and 20½¢ @ 21¢ Hallett's.

New York Metal Exchange.

The following sales are reported:

THURSDAY, January 30.	
10 tons Tin, January.....	20.80¢
100 tons Tin, March.....	20.90¢
10 tons Tin, February.....	20.85¢
10 tons Tin, spot.....	20.90¢
50 tons Tin, March.....	21.00¢
20 tons Tin, February.....	20.75¢
20 tons Tin, April.....	20.80¢
30 tons Tin, May.....	21.00¢
10 tons Tin, February.....	21.00¢
10 tons Tin, delivery February 1.....	21.00¢
FRIDAY, January 31.	
10 tons Tin, February.....	21.20¢
25 tons Tin, February.....	21.30¢
50 tons Tin, prompt shipment.....	21.35¢
100 tons Tin, prompt shipment.....	21.30¢
SATURDAY, February 1.	
110 tons Tin, April.....	21.10¢
MONDAY, February 3.	
10 tons Tin, February.....	21.15¢
25 tons Tin, April.....	20.90¢
TUESDAY, February 4.	
25 tons Tin, April.....	20.85¢
25 tons Tin, April.....	20.80¢
25 tons Tin, March.....	20.75¢
10 tons Tin, February.....	20.80¢
35 tons Tin, March.....	20.80¢
15 tons Tin, April.....	20.70¢
10 tons Tin, May.....	20.70¢

Coal Market.

The Anthracite Coal trade has not improved. Producers, however, solace themselves with the reflection that, considering all the adverse circumstances, mostly unforeseen and beyond control, the situation might have been far more aggravating. There has been no overwhelming amount of Coal thrown on the market, and none has been given away. True, for several weeks past schedule prices have scarcely been recognized in effecting sales. On the other hand, the pressure to sell has not resulted in reckless competition. The unusual demand for furnace and manufacturing sizes operates as a staying power, making it necessary to keep the mines working, and as respects certain descriptions full prices are obtained. The weak spot is the unavoidable making of sizes not wanted, while filling peremptory orders. The reported shipments for the week ending January 25 were 501,920 tons—showing little variation from 500,000 tons per week for some time past. Total for the year to date 1,944,000 tons, a decrease of about 300,000 tons compared with the same time last year.

Bituminous Coal is without change.

Imports.

Hardware, Machinery, &c.

Boker, Hermann & Co., Anvils, 33, Mdse., cs., 50
Crossman, W. H. & Bros., Mach'y, cs., 3
Curley, J. & Bro., Cutlery, cs., 3
Dressler, Oscar & Co., Mach'y, cs., 222
Field, Alfred & Co., Anvils, 56; Hardware, pgs., 8
Foley, Edw., Mach'y, cs., 1
Graef Cutlery Co., Cutlery, cs., 5
Hamacher, Schiemmer & Co., Nails, cs., 47
Ironclad Mfg. Company, Mdse., cs., 10
King, Hezekiah, Mdse., cs., 20
Meeker & Carter, Galvanized Bricks, cks., 122
Newton & Shipman, Files, cks., 2
Overton & Co., Mach'y, pgs., 22
Pearson S. & Co., Mach'y, cs., 21
Schoverling, Daly & Gales, Mdse., cs., 8
Schwarzenbach, John W., Mach'y, cs., 14
St. George, W. S., Mach'y, cs., 7
Taylor, Thos., Mdse., cs., 4
Thebaud Bros., Mach'y, bxs., 2; do., pgs., 18;
Thompson, J. A., Iron Pots, 130
Wiebusch & Hilger, Mdse., cs., 50
Order—Iron Pots and Ovens from the Paris Exhibition, 723; Anvils, 75; Hardware, cs., 5

British Iron and Metal Markets.

[Special Cable Dispatch to The Iron Age.]

LONDON, WEDNESDAY, February 5, 1890.

The market for Pig Iron has been unsettled and depressed. Consumers and shippers have purchased sparingly and speculative interest has been chiefly in the direction of realizations, owing to lack of incentive to further purchases or holding. Scotch warrants sold down to 52/1 and large lots of Cleveland were let go, resulting in a drop in prices for the same to 52/. Additional furnaces are blowing in for the production of Hematites, and that fact has weakened warrants, although a good demand is reported for makers' brands for spring shipment to the Continent.

In Tin Plate business has been small and the market is weaker, with 16/3 now a full price for Bessemer. The American demand has not improved to the slightest extent. The works in all localities continue busy.

Renewed inquiry from America, along with fair purchases and attempts to cover short sales, materially strengthened the market for Block Tin, and on Friday business was done at up to £94. 12/6 for prompts. Since then the movement has been in the opposite direction.

There is little good quality Copper available here at the present. The stock con-

sists chiefly of English and American Ingots, inferior brands of Chili Bars and Anaconda Matte. Smelters continue to show Chili Bars a preference, owing to their being cheaper than the prices at which Argentiferous Ore and Matte is held. There is a scarcity of furnace material generally. Deliveries of Bars during January were unusually heavy, and 400 tons were shipped to France. A sale was made of 80 tons Montana Matte at 10/3, to arrive in Liverpool. Speculation in Copper has been small. A lot of 250 tons Merchant Bars was sold at £48. 12/6, cash, on Tuesday.

Reports from the Continental markets up to the close of the week reported brisk trade in Iron and Steel of nearly all descriptions. Continued short supplies of fuel cause anxiety and prices are up more or less all around.

Scotch Pig.—The market unsettled and irregular, with little doing. Best brands are offered 1/6 @ 2/ cheaper and others show 3/ @ 6/ decline.

No. 1 Coltness, f.o.b. Glasgow	78/6
No. 1 Summerlee, "	79/
No. 1 Gartsherrie, "	76/
No. 1 Langloan, "	75/
No. 1 Carnbroe, "	55/
No. 1 Shotts, " at Leith	76/6
No. 1 Glengarnock, " Ardrossan	75/
No. 1 Dalmeilington, "	65/
No. 1 Eglinton, "	56/

Steamer freights, Glasgow to New York, 2/; Liverpool to New York, 10/.

Cleveland Pig.—The market depressed and irregular, owing to the heavy decline in warrants. Makers' price for No. 3 Middlesborough about 53/6 for prompt.

Bessemer Pig.—Prices are very unsettled and cannot be quoted with any accuracy. Makers' figures for West Coast brands, mixed numbers, nominally quoted at 82/, f.o.b. shipping point.

Spiegeleisen.—There is still a good demand and previous prices are asked. English 20 % quoted 130/ @ 135/, f.o.b. at works.

Steel Rails.—More demand is noted this week, and makers are very firm on prices. Heavy sections quoted at £7. 5/ and light sections £7. 12/6 @ £8, f.o.b. at N. W. England shipping point.

Steel Blooms.—There is still a fairly good demand for these, and makers' prices are firm. We quote £6. 15/ for 7 x 7, f.o.b. at N. W. England shipping point.

Steel Billets.—The demand continues good and makers hold for full previous prices. Bessemer, 2½ x 2½ inch, £7, f.o.b. at N. W. England shipping point.

Steel Slabs.—Prices are maintained and the demand is good. Bessemer, £7, f.o.b. at N. W. England shipping point.

Old Rails.—There continues to be a fair demand and prices are held firmly. Tees quoted at £4. 2/6, and Double-Heads, £4. 5/ @ £4. 10/, f.o.b.

Scrap Iron.—A fair business doing and prices firmly held. Heavy Wrought quoted £3. 10/ @ £3. 15/.

Crop Ends.—The demand continues fair and prices are firm. Bessemer quoted £3. 12/6 @ £3. 15/, f.o.b.

Tin Plate.—Business moderate and prices nominal, with some business at a decline. We quote, f.o.b. Liverpool:

IC Charcoal, Alloway grade	17/6 @
IC Bessemer Steel, Coke finish	16/3 @
IC Siemens "	16/6 @
IC Coke, B. V. grade	15/6 @
Charcoal Terne, Dean grade	14/6 @ 15/

Spelter.—Prices about £1 lower and demand moderate. Quoted at £23 for Ordinary Silesian.

Manufactured Iron.—The market very quiet and prices without important change. We quote, f.o.b. Liverpool:

Staff. Marked Bars	£ s. d.	£ s. d.
" Common "	10 0 0 @	0 0 0
Staff. B'l'k Sheet, singles	9 0 0 @	9 5 0
Welsh Bars (f.o.b. Wales)	11 0 0 @	11 5 0
	8 7 6 @	8 12 6

Tin.—Business quieter and prices steadier at the decline. Straits quoted at £93. 15/, spot, and £94. 15/ for three months' futures.

Copper.—There is little doing and prices show slight change. Chili Bars quoted at £48. 17/6, spot, and £49. 7/6, three months' futures. Best Selected, £56. 10/.

Lead.—There has been a fairly active market and prices are steadier. Quoted at £12. 17/6 for Soft Spanish.

Foreign Markets.

EQUIVALENTS.

	Cents.
Franc, Peseta or Lira	10.3
Florin (Netherlands)	40.3
Florin (Austria)	35.9
Wileis (Portugal)	1.08
Wileis (Brazil)	34.6
Mark (Germany)	23.5
	Pounds
Kilogram	2.205
Pical	134.

BRAZIL.

PARA, January 31, 1890.—**India Rubber.**—Our market remains firm; January receipts figure up 2310 tons.—Per cable direct.

CHINA.

HONG-KONG, December 17, 1889.—**Petroleum.**—The upward tendency is making further progress. Spot cargo Comet Oil is now quoted \$2.45, and there is some speculative inquiry for early steamer shipment at \$2.20 per case. Sales, 20,000 cases on private terms. Supplies expected are rather heavy.—Arnhold, Karberg & Co.

CHILI.

VALPARAISO, December 6, 1889.—**Copper.**—The cable quotation from London, to-day, is £49, and holders decline naming a price, expecting, as they do, a still higher figure soon. Coal is scarce and high, a cargo Orrell bringing 51/ and Newcastle 53/; the latter was sold on the spot at 42/ and Australian 38/. Exchange, 90 days sight, 25¼d.—Weber & Co

EAST INDIES.

COLOMBO, CEYLON, December 12, 1889.—**Plumbago.**—Has been moderately active and steady at following quotations in rupees per ton: Large Lumps, 220 @ 250; Ordinary Lumps, 180 @ 230; Chips, 100 @ 130, and Dust, 70 @ 100. Shipments since October 1 have been distributed as follows: To England, 25,395 cwt., against 15,434 in 1888; to Antwerp, 2778, against 1027; to Hamburg, 777, against 851; to Bremen, 368, and to the United States, 81,009, against 22,209; together 110,335, against 39,690. In 1887 the shipments were 51,026 cwt.; in 1886, 55,066. Exchange.—Six months' sight on London, 1/5 11-32.—Volkart Bros., Ceylon and Malabar Coast, through their agent in New York, Mr. John W. Greene, 82 Wall street

GERMANY.

HAMBURG, January 25, 1890.—**Iron.**—The Rheinisch-Westphalian market has been quiet, but sustained by the scarcity and high cost of coal and coke, as well as by the fact that all makers have booked orders for months to come at remunerative figures. Spiegel, 10 to 12 per cent.; Manganese remains well held at 102 marks. Spelter.—The total improvement in Silesia during 1889 has been 7 marks per 50 kg, and the closing price of the year was for Godulla 23.65 marks per 50 kg.; for W. H., 24; there are 23 smelting works in operation in Silesia.—Borsenhalle.

SPAIN.

BILBAO, January 11, 1890.—**Iron Ore.**—Little has been done either on the spot or in futures, because of the raised pretensions of mine owners, which exporters cannot subscribe to, not being limited high enough. Hence quotations are nominal for the moment. Total shipments from this port of Spain last year have been 3,885,612 tons, against 3,591,637 in 1888 and 4,170,422 in 1887. Total shipments

of Ores and Metals from Spain during the first 11 months have been as follows :

	1887.	1888.	1889.
	Tons.	Tons.	Tons.
Calamine.....	21,873	24,643	22,653
Pyrites.....	701,841	756,941	720,635
Iron Ore.....	4,923,947	4,195,403	4,633,971
Pig Iron.....	102,798	66,722	64,552
Precipitate.....	25,500	26,458	31,775
Quicksilver.....	1,122	802	1,724
Pig Lead.....	121,637	118,737	120,518

Totals.....5,898,718 5,189,796 5,595,818

The Rio Tinto Copper Company have commenced litigation against the Government for reducing open air Ore roasting 50 % since the 1st instant.—*Bilbao Maritimo y Comercial.*

MARKETS BY TELEGRAPH.

WEDNESDAY AFTERNOON.

Cincinnati.

Extra dullness is the one prominent feature of the local Pig-Iron market; buyers have retired from the field, having no inducement to buy Pig, orders for Manufactured Iron being light and general business slow. Furnaces, however, hold firm and are encouraged by the fact that there is less Iron in second hands and less pressure to sell by speculators. The small lots of Northern Iron being sold, however, are on a lower basis than that occupied by Southern stacks. Prices for round lots are entirely nominal.

Chicago.

Very fair trade in Pig has been enjoyed the past few days, good sales of both Coke and Charcoal having been made; outside lots are being closed out rapidly at prices not much under regular rate. Inquiries have lately increased also. The demand for Old Iron Rails is light, but Old Steel Rails are as active as anything in the list. Small lots of Bessemer Pig have been sold at \$24 and an inquiry has been received for several thousand tons, which is quite an event after so long a period of dullness. Steel Rails are selling to a limited extent only, and prices remain as before quoted. Nails a little lower, but the general impression is that the weakness is only temporary. Wire Nails are in better demand than Cut at present. A large representation of the Hardware trade of the West is in attendance at the Barb-Wire meeting held here to-day. Important action is expected.

The announcement of the purchase of the foundry and machine shop plant of Fraser & Chalmers, of Chicago, by an English syndicate, is denied. "We have not sold out," said a member of the firm, "but on the contrary have extended the field of our business to England. We are shipping engines, machinery, and mining mills to South America, Australia, Central America and South Africa, but we are handicapped and our operations are largely confined to the United States and Mexico, because we cannot get ships. Only a short time ago we were obliged to send to Liverpool for two vessels, which we loaded at New Orleans. One carried 1700 tons, and the other 3000 tons, which went to Africa. The cost for transportation was \$100,000. English capital buys the machinery we send abroad and Englishmen unite with us in building large shops in England. We are looking for a site now and hope to get near London, but must be at an available port. Our Chicago shops have all they can do to supply the American demand. The English manufacturers

lack the experience. We have been building stamp mills for years, and know the kind of mill needed for the different kind of ores. The Englishmen know nothing about this, and in their past purchases have accepted the mills we recommended as the proper ones for extracting the metal from the respective ores at the different mines. The new company consists of the Fraser & Chalmers Company and a number of Englishmen. This syndicate will own both the Chicago and the English plant. Fraser & Chalmers have an interest in both plants and so have the new men.

Terminal Facilities for New York.

The current year promises to be one of unusual activity among the railroads leading out of New York. The companies have not all made up their budgets yet, but the projects for 1890 will call for probably a greater expenditure of money than has been made for a like period within the last 10 years. The trunk lines will make few extensions, but the terminals will be vastly improved; stations will be built; tracks will be elevated or sunken or doubled; heavier rails will be put down, and several of the roads are turning their attention to block signal appliances for the additional safety of their patrons. The railroads are wrestling over the water front of New York Harbor, and their purchases of a year foot up into the millions. The "projects" of 1890 will not all be completed this year. Some of them are conceived with the idea that the World's Fair will come to New York, in which case they will be pushed forward with all possible rapidity. No railroad has been counting on this probability more than the Pennsylvania Railroad. It has laid all its plans and calculated how half a million passengers a day may be handled if necessary, and all that remains is to set its men to work. If New York should not get the fair the company will simply complete its projects at leisure, and they won't come amiss for the increased business of 1900 a.d. The contemplated improvements of the railroads about New York will probably take not less than \$15,000,000, and it is safe to say that half that amount will be spent this year.

The Pennsylvania Railroad is elevating its tracks into Jersey City, back from the Point of Rocks. It was long an uncertainty whether they would enter the station elevated or on a level. It has just been decided to do the former, and this will necessitate numerous other changes in the stations on both sides of the river. A fine new brick and stone depot will be built in Jersey City, larger in every way than the old station. It will probably extend lengthwise of the river, presenting its long side to the train shed, as nearly all modern stations do, affording more yard room for trains as well as easier access for the passengers. Probably the local freight yard at Jersey City will be removed to Harsimus Cove at no distant day, and all this yard will be used for passenger trains in waiting. The new station will extend considerably further north than the present wooden building. At about Henderson street the four tracks will spread out, fan-shaped, and the northernmost tracks will gradually seek the level of the yard.

Double-decked ferry-boats will be used, so that foot passengers can enter on a level with the street and train passengers from the elevated station on to the upper deck. There will be a similar arrangement on the New York side of the river at Cortlandt and Desbrosses streets. The company has already applied to the city authorities for permission to bridge West street, and if it is granted that alone will be a great improvement over the existing order of things, where a person often risks

his life between the crowded trucks in order to get the proper boat for his train.

But the Pennsylvania has more on foot than this. It has bought up all the property adjoining the new Central Railroad of New Jersey building and directly opposite the Pennsylvania ferry. The company has acquired all the rest of the block bounded by West, Cortlandt and Washington streets, except two small buildings at the Cortlandt and Washington street corner, about 75 feet front, and it is going to erect a fine passenger station on the site. If it gets permission to bridge West street, the bridge will extend from the second story of this new station across to the ferry, and West street will be a thing of the past to the public. The main entrances will be on Cortlandt street, and it is understood to be a part of the plan to make this a business building as well as a station. The two new railroad buildings will clean out a lot of old rookeries and probably lead to other improvements in the vicinity. The Pennsylvania road already has one double-decked ferry-boat and it will get two more. It is said to be the intention to make them screw propellers, like the Bergen of the Hoboken line, and the company has been watching the success of that boat during the winter. So far it has had no floating ice to contend against. It is much roomier than the side-wheelers. The Pennsylvania has come to be a firm believer in the policy of elevated entrances to cities. More elevated tracks are to go up in Philadelphia, and if the authorities sanction it the tracks will be elevated on the New York division through both Elizabeth and New Brunswick. Besides this, the company will lay four tracks on the elevation, where they now have only two. If the New Brunswick Council will not permit this improvement, President Roberts says that they will build the main line around the town and let New Brunswick be merely a way station. The idea of the company is to increase its capacity for speed at the same time as for volume. At present the Pennsylvania cannot do better than 1 hour and 50 minutes between Jersey City and Philadelphia, a distance of 89 miles. Take out the street crossings of Jersey City, Elizabeth and New Brunswick, which will be done inside of two years, and without much doubt the limited trains will cover the distance in about a mile a minute. The detour of the main tracks around Newark, which is in course of construction, has this end in view, and it is evidently becoming the tendency everywhere to give the large cities the best possible limited service, leaving the small cities mere way points.

The chief work of the New York Central Railroad will be on the depressed tracks of the Harlem road and the elevated tracks into Buffalo, both of which have been fully described. When the work is completed over \$4,000,000 will have been spent on them. It is expected that the Harlem depression will be finished before the end of the year, and the new elevated rapid transit stations will be suspended over the tracks. To eradicate an element of danger where the tracks of the New Haven road leave those of the Harlem, just above Williamsbridge, the east-bound track of the former will be elevated and brought over those of the Harlem tracks on a bridge. This will take out a dangerous grade crossing. Trains run "left handed" up to Woodlawn Junction—that is, they take the western track in going north from the Grand Central station—and in order to get on to the "right" track again, when the New Haven road is reached, they have to cross over the "down" tracks. There is no crossing for an inbound New Haven train to do, and hence the "down" track will not need to be elevated.

Hardware.

There is little change in the condition of the market. The demand continues fair, and with the advance of the season there is some increase in the volume of business. Prices are without material change and are well maintained. The principal features of interest are noted below.

Barb Wire.

There is a somewhat increased demand in this market and the volume of business doing is fair for the season. Prices continue as before for Four Point Galvanized, carload lots, 4 cents; 3-ton lots, 4.1 cents, and small lots, 4.3 cents, delivered.

Wire Nails.

There is no change in the general quotations made by manufacturers, but there are indications that some of them are desirous of obtaining orders. The heavy sales made within the past few months have supplied many of the larger buyers, whose purchases are probably sufficient to carry them through the season. Most of the mills are well occupied with orders, but there are indications that those of some are nearly filled, and efforts are being made to make sales at slight concessions. Offers by one or two leading manufacturers at special prices, with a view to disposing of some Nails on hand, are not, however, to be regarded as indicative of the general condition of the market.

Cut Nails.

The volume of business continues quite good for this season, and there is very little cutting. We quote Iron Nails, on dock, in carload lots, at \$2.10.

W. E. S. Baker, of Philadelphia, secretary of the Atlantic States Nail Association, which includes the Nail mills of New England, New Jersey, Eastern and Central Pennsylvania and Virginia, has published his usual annual report. Twenty-six mills, with 1802 Nail machines, made the following product and stocks:

Production of Eastern Nail Works.

Year.	Product. Kegs at 100 lbs.	Stock at close of year.
1889.....	2,174,305	316,537
1888.....	2,403,932	360,674
1887.....	2,510,588	327,080
1886.....	2,830,965	338,198
1885.....	2,711,195	362,733
1884.....	2,220,130	241,417

From these data we compile the following statement of the sales of these mills during the years under review:

Sales of Eastern Nail Works.

Years.	Kegs.
1889.....	2,248,142
1888.....	2,340,338
1887.....	2,521,706
1886.....	2,895,500
1885.....	2,649,879

While these figures clearly illustrate the steadily declining business done by the Eastern Cut Nail mills, they more fairly represent the relative business done in 1889 and 1888 than the figures of production quoted. In other words, the make during the year 1889 was below the demands upon the mills so that stocks were reduced by 74,000 kegs. Still the sales for the year fell nearly 100,000 kegs below those of 1888. Unfortunately we do not possess any statistics on the production of Wire Nails, but it is highly probable that the Wire Nail not only captured the natural increase in the consumption of Nails, but also that it is largely responsible for the loss of business on the part of the Eastern Cut Nail mills. Another undetermined factor in the situation is the amount of trade secured east of the Allegheny mountains by the mills in Wheeling and in the Ohio Valley.

Mr. Barber's figures for the Eastern mills are not quite complete. He esti-

mates that those not reporting, Towanda, Boonton, Standard and Plymouth produced in 1889 70,000 kegs. Last year the figure was 58,000 kegs.

In a memorandum attached to his report Mr. Baker calls attention to the fact that Mr. James M. Swank's last Directory gives 75 naileries in the United States with 6066 machines. By working 200 days in the year, at 8 kegs per day for a machine, an annual capacity of 9,705,600 kegs is reached. This does not include 37 wire-nail works and several tack works which produce a heavy tonnage of small nails, probably 2,000,000 kegs. This aggregate capacity is certainly still very largely in excess of present possible requirements, so that nails can only be affected indirectly by scarcity or an advance in raw materials, or by causes tending to forcibly throw a large number of mills into idleness. How tremendously the capacity has grown is shown by the statement made by Mr. Baker, that in a report issued by the Association, April, 1871, it was shown that then there were in the United States 51 nail factories, with 2840 machines, whose annual capacity was 5,478,000 kegs, while the product in 1870 was 3,646,000 kegs.

Miscellaneous Prices.

The advance in the price of Agricultural Wrenches to which we referred in a recent issue as likely to occur has been made and these goods are accordingly about 5 per cent. higher. The regular printed price in small quantities is 75 per cent. discount, and a range of from 75 per cent. to 75 and 10 per cent. indicates the general market price.

Cast Iron Butts are regularly held by the manufacturers at the recently advanced prices, but the figures at which they are often sold by the jobbers in comparatively small lots closely approximate the manufacturers' extreme prices. The market is, however, in a very satisfactory condition and is characterized by a good tone.

Many of the principal jobbers manifest a disposition to make a leader of the Lightning Hay Knives and are accordingly offering the goods to the retail trade at lower prices than they can be procured from the manufacturers. Our advices are that many retail houses purchase the goods at prices ranging from \$8 to \$9, and some of the principal jobbers are offering them at \$7.75 per dozen.

Notwithstanding the assumed strength of the combination recently formed by the manufacturers of Planes there are already indications of some irregularity as special concessions, such as deliveries or extra discounts, are given in a quiet way to favored buyers. Prices are, however, in general well maintained.

The manufacturers of Braces have quite generally advanced their prices, and while it was not found feasible to accomplish all that was contemplated in the way of an agreement among the manufacturers, the market is regarded as in a very satisfactory condition.

The following are the prices of patent Fiber Head Mallets manufactured by E. M. Chaffee, Onondaga Valley, N. Y., for whom William H. Jacobus is agent, 90 Chambers street, New York, the list being subject to a discount of 30 per cent.:

No.	Inches in Diameter.	List per Dozen.
No. 2.....	2	\$6.50
No. 2½.....	2½	7.50
No. 3.....	3	9.00

The Chieftain Hay Rake Company, Canton, Ohio, are manufacturing the Superior Sawset which is referred to in their advertisement on page 85. This Sawset is sold at \$15 per dozen, subject to a discount of 50 per cent.

Nason Mfg. Company, 71 Beekman street, New York, announce that in consequence of the recent advances in material they have withdrawn the quotations on Radiators.

The market for Strap and T Hinges continues as at our last report, prices being well maintained by the different manufacturers. In this connection it may be interesting to the trade to observe the announcement of James Mann & Sons, Buffalo, N. Y., page 65, in which 6, 8 and 10 inch Strap Hinges are quoted at discount 75 per cent.

W. V. Taylor, Allegheny, Pa., has issued price-list No. 2 bearing date, January, 1890. It is a well-printed and fully-illustrated pamphlet of more than 20 pages, showing his varied line of Electric Bell Sets for front doors, dining-rooms, windows, factories, elevators, &c., and Electrical Supplies. The different sets are described, and the manner in which they are put up, and some specialties are also shown. The list is subject to a discount of 20 per cent.

We learn that there is some confusion as to the list prices of Hexagon Netting, as some parties are apparently using the old English instead of the one which was adopted by the manufacturers five years ago, and is properly regarded as the standard list. It was carefully prepared and was based upon the actual cost of the different wires. In view of the existing confusion and the desire of some of the large dealers to have the correct list brought to the attention of the entire trade, we print it below. It is subject to the regular discounts as given in our current Hardware prices:

2 Inch Mesh.		1 Inch Mesh.	
No.	Per sq. ft.	No.	Per sq. ft.
14 Wire.....	\$0.09½	16 Wire.....	\$0.14
15 ".....	.07½	17 ".....	.10
16 ".....	.05½	18 ".....	.07½
17 ".....	.04½	19 ".....	.06
18 ".....	.03½	20 ".....	.05
19 ".....	.02½	¾ Inch Mesh.	
20 ".....	.02	18 Wire.....	\$0.12½
1½ Inch Mesh.		19 ".....	.10½
16 Wire.....	\$0.08¾	20 ".....	.09
17 ".....	.07¾	¾ Inch Mesh.	
18 ".....	.04½	18 Wire.....	\$0.19
19 ".....	.03½	19 ".....	.18
20 ".....	.03	20 ".....	.16
1¼ Inch Mesh.		22 ".....	.14
16 Wire.....	\$0.11	¾ Inch Mesh.	
17 ".....	.08½	18 Wire.....	\$0.28
18 ".....	.06	19 ".....	.25
19 ".....	.04½	20 ".....	.20½
20 ".....	.03¾	22 ".....	.18½

The Matchless Metal Polish Company, 82 to 88 South Market street, Chicago, have issued circulars relating to their Polishes and Buffing Materials, containing testimonials to their general excellence. They manufacture Matchless Metal Polish, a creamy white paste; Baker's Tripoline, for heavy work; Baker's Standard Navy Polish, for marine work; Mexoline, finishing powder; White Diamond Glass and Silver Polish; Wilson X and XX Tripoli Flour; Mexican White Quartz; Buffing Compositions, &c. Their buffing compositions are in use in all the leading brass and nickel-plating establishments in the West and many in the East. A recent order from one customer alone called for 12,000 pounds. The company also have a good export trade. Among their late shipments abroad were 1600 boxes of Polishes to England and 12 gross of Glass and Silver Polish in 1-pound cans to Cuba. The following is their price-list:

Matchless Metal Polish.

No.	Each.	Per dozen.	Per gross.
No. 2, 3-ounce boxes.....	\$0.10	\$0.75	\$7.50
" 3, 4 ".....	.15	1.10	11.50
" 4, 8 ".....	.25	2.10	21.00
" 5, 16 ".....	.40	3.50	37.50
3-pound pails.....	1.00	10.50
5 ".....	1.50	15.00
10 ".....	2.50	25.00
25 ".....	6.00	60.00

Baker's Tripoline.

No.	3-ounce boxes	Each.	Per dozen.	Per gross.
No. 2,	3-ounce boxes	\$0.10	\$0.75	\$7.50
" 4,	8 " " "	.20	1.75	18.50
" 5,	16 " " "	.30	3.00	\$2.50
3-pound pails		.80	8.50	
5 " "		1.25	12.50	
10 " "		2.00	20.00	
25 " "		4.75	50.00	

Baker's Standard Navy Polish.

No.	16-ounce boxes	Each.	Per dozen.	Per gross.
No. 5,	16-ounce boxes	\$0.25	\$2.50	\$25.00
5-pound pails		1.00	10.50	
10 " "		1.75	17.50	
25 " "		4.00	40.00	

Meroline.**(FINISHING POWDER.)**

Each.	Per dozen.	Per gross.
12 ounce package	\$0.15	\$1.25
		\$12.50

White Diamond Glass and Silver Polish.**(POWDER.)**

Each.	Per dozen.	Per gross.
Wood boxes (round), 1 1/4 x 2 1/4 inches, handsomely labeled	\$0.10	\$0.75
1/4-pound tins	.25	2.00
1 " "	.40	3.50

Wilson's X and XX Tripoli Flour.

No.	4-ounce paper packages	Each.	Per dozen.	Per gross.
No. 1,	12-ounce pepper box tins	\$0.50	\$4.50	
No. 2,	25 ounce	1.00	10.00	
		2.00	20.00	

Mexican White Quarts.

Each.	Dozen.	Gross.
1-pound packages	\$0.10	\$0.75
		\$8.00

Buffing Compositions.

X—This grade is adapted to cutting down the heaviest and hardest metals		
Less than 100 pounds and upward.	Cask lots 450-500 pounds.	
\$0.06	\$0.05 1/4	\$0.06

XX—For cutting down purposes; not quite as coarse as X. This grade will also finish work where too fine a color is not required.

Less than 100 pounds and upward.	Cask lots 450-500 pounds.	
\$0.06 1/4	\$0.06	\$0.05 1/4

XXX—Taking the place and doing double the work of rouge (while being much lighter).

Less than 100 pounds and upward.	Cask lots 450-500 pounds.	
\$0.12 1/4	\$0.11	\$0.10 1/4

Cleveland Block Company,

Cleveland, Ohio, have adopted a revised price-list which goes into effect February 1. The new prices are conveniently printed, with illustrations showing the different goods. The company refer to these Blocks as superseding Wooden Blocks, being cheaper, stronger, more durable and lighter, score for score. They emphasize the point that each of their sizes is proportionately stronger and wider in score than the size next smaller. Their regular Blocks are referred to as taking as much rope as Wide Mortise Wooden Blocks. The following are the revised list-prices of Malleable Iron Tackle Blocks, Wood Mortise Heavy Purchase Blocks, New Style Patent Automatic Snatch Blocks and Malleable Iron Blocks for Wire Rope, the list being subject to a discount of 50 per cent.

Wide Mortise Heavy Purchase Blocks, with Rings, Hooks or Shackles.

Dimensions.		Plain Bushing.		Self-Lubricating Brass Bush.	
Length of shell.	Diam. rope.	Price.	Trade No.	Price.	Trade No.
12 in.	1 1/2 in.	Single...	\$6.25	169	\$7.85
		Double...	10.25	171	13.50
		Triple...	15.00	173	20.00
14 in.	1 3/4 in.	Single...	9.00	175	10.80
		Double...	15.00	177	18.50
		Triple...	20.00	179	25.50
16 in.	2 in.	Single...	13.00	181	15.00
		Double...	21.00	183	25.00
		Triple...	32.00	185	38.00

Malleable Iron Tackle Blocks.

Dimensions.		Plain Bushing.		Roller Bushing.		Self-Lub. Brass Bushing.	
Length of Shell.	Diam. of Rope.	Price.	Trade No.	Price.	Trade No.	Price.	Trade No.
4 in.	3/4 in.	Single.....	\$0.90	1		\$1.65	301
		Double.....	1.75	3		3.25	303
		Triple.....	2.50	5		4.75	305
5 in.	7/8 in.	Single.....	1.00	7	\$1.50	1.80	307
		Double.....	1.90	9	2.90	3.50	309
		Triple.....	2.75	11	4.25	5.15	311
6 in.	1 in.	Single.....	1.25	13	1.75	2.10	313
		Double.....	2.25	15	3.25	4.00	315
		Triple.....	3.25	17	4.75	5.80	317
7 in.	1 1/8 in.	Single.....	1.50	19	2.10	2.45	319
		Double.....	2.70	21	3.85	4.60	321
		Triple.....	4.00	23	5.80	6.85	323
8 in.	1 1/4 in.	Single.....	1.85	25	2.55	2.90	325
		Double.....	3.20	27	4.60	5.30	327
		Triple.....	4.75	29	6.85	7.90	329
9 in.	1 1/2 in.	Single.....	2.40	31	3.20	3.55	331
		Double.....	4.00	33	5.60	6.30	333
		Triple.....	5.50	35	7.90	9.00	335
10 in.	1 3/4 in.	Single.....	3.10	37	4.05	4.40	337
		Double.....	5.10	39	7.00	7.70	339
		Triple.....	7.00	41	9.85	11.00	341
12 in.	2 in.	Single.....	5.00	43	6.00	6.45	343
		Double.....	8.25	45	10.35	11.15	345
		Triple.....	11.75	47	14.90	16.00	347
14 in.	2 1/4 in.	Single.....	7.50	49	8.75	9.10	349
		Double.....	11.75	51	14.25	15.00	351
		Triple.....	16.50	53	20.25	21.30	353

New Style Patent Automatic Snatch Blocks, with Self-Lubricating Bushings.

Length of shell.	Size of sheave.	Diameter of rope.	Price.	Trade No.
7 in.	3 1/2 x 1 1/2	3/4 @ 3/4	\$5.50	201
8 in.	4 x 1 1/2	1 @ 1 1/2	7.00	203
10 in.	5 1/2 x 1 1/2	1 1/4 @ 1 1/4	9.00	205
12 in.	7 x 2	1 1/2 @ 1 1/2	11.50	207
14 in.	8 x 2 1/2	1 3/4 @ 1 3/4	15.00	209
16 in.	9 x 2 1/2	2 @ 2 1/2	20.00	211

Malleable-Iron Blocks for Wire Rope, with Self-Lubricating Bushings.

Length of shell.	Diameter of rope.	Price.	Trade No.
14 in.	3/4 @ 3/4	Single....	\$9.50
		Double....	17.50
		Triple....	25.50
16 in.	1 1/2 @ 1 1/2	Single....	12.50
		Double....	23.00
		Triple....	31.00
18 in.	2 @ 2	Single....	15.00
		Double....	29.00
		Triple....	41.50

Items.

Iowa Barb Wire Company, 98 Reade street, New York, who are well known to the trade as prominent manufacturers of Barb Wire, have made arrangements which will enable them to supply all the leading sizes of Bright, Annealed, Coppered and Galvanized Wire.

A very complete and creditable Hardware catalogue has been issued by Fletcher, Jenks & Co., Detroit, Mich. It is an imposing volume of 1000 pages, representing the extensive line of Hardware, Iron and Steel and related goods which they are selling as importers and wholesale dealers. It thus relates to Cutlery, Guns, Revolvers, Ammunition, Fishing Tackle, Sportsmens' Sundries, Tinners' Stock, Steam, Gas and Water Fittings, Brass

Goods and Plumber's Supplies, in addition to a very complete assortment of Hardware, Heavy and Shelf. In this catalogue the aim has been to illustrate and describe in a convenient form the various lines carried in stock, and manufacturers' numbers and lists have been followed as far as possible. The catalogue is printed on exceptionally good paper. A discount sheet accompanies it, giving quotations which are intended for the guidance of dealers, and especially on goods they do not carry in stock. The convenience of the arrangement of the book and the manner in which it is gotten up will be appreciated by the trade, while it is also an evidence of the enterprise of the house issuing it, and their prominent position as Hardware jobbers.

Harmon & Dixon, 118 Chambers street, New York, have been appointed agents by the J. Barton Smith Company, Philadelphia, and will carry a stock of their goods for the convenience of customers. Their announcement in regard to other agencies will be found on page 65.

Palmer Hardware Mfg Company, Troy, N. Y., is putting on the market an interesting line of new Transom Lifters, which are designated as Dickson's Champion.

St. Albans Foundry, St. Albans, Vt., illustrate in their catalogue their Railway Horse Powers, of which a full description is given, especial attention being called to new improvements. Combined Saw Frame and Swing Tables, Speed Regulators, Feed-Shredders and other machines are also illustrated.

Pratt & Letchworth, Buffalo, N. Y., in their calendar for February call attention prominently to their Hames, while the envelope illustrates some of their leading goods in the Saddlery Hardware line.

The Empire Knife Company, West Winsted, Conn., which has been a partnership (Beardsley & Alvord) since 1856, and which is one of the oldest houses engaged in the manufacture of American Pocket Cutlery, have just been incorporated as a joint stock company. James R. Alvord has retired from the management of the

firm and his sons, who succeed him, have been chosen officers as follows: C. L. Alvord, president; Geo. S. Alvord, vice-president; S. L. Alvord, secretary and treasurer. The line of manufactures of the company is being largely increased in their extensive assortment of Cutlery, Specialties, Corkscrews, &c. Their Eastern trade will continue to be looked after directly from the West Winsted office, and their Western and Southern trade will continue in the hands of McCoy & Sanders, 26 Warren street, New York, who have been their sole agents in that territory for the past three years.

The trade will observe on page 72 the advertisement of the Eastman Company, Rochester, N. Y., in which they call attention to their new Kodak Cameras. These goods are widely known and have had a large sale, but the company have recently been adding many new styles and sizes, so that the assortment is much enlarged.

John Chatillon & Sons, 85, 87 and 89 Cliff street, New York, have issued a condensed list of Chatillon's Spring Balances, arranged consecutively according to number. It will be found very convenient, giving as it does in compact form the size, description and price-list of their large and varied line. They will be pleased to send copies of it to those in the trade who desire them.

John A. Lowell & Co., engravers and printers, 147 Franklin street, Boston, Mass., have issued an elegantly engraved calendar for the present year. While it is an attractive specimen of the high class of work done by them it will be appreciated for its convenience and beauty as a calendar.

The trade will be interested in the striking advertisement on page 90, which is made by the Shepard Hardware Company, Buffalo, N. Y. The effective method in which attention is called to their important line will secure the attention of our readers.

The Nubian Iron Enamel Company, Chicago, Ill., accompany their February calendar with a pamphlet containing *fac-similes* of testimonials from parties who have handled or used their goods. This pamphlet is elegantly printed and will doubtless serve its purpose well.

Randolph & Clowes, Waterbury, Conn., issue a convenient calendar in which attention is called to their important line as manufacturers of Sheet Brass and Copper, Seamless Drawn Brass and Copper Tubing, &c.

In a recent issue of the *Press and Carolinian*, Hickory, N. C., much information is given in regard to the principal enterprises of that place, and among those the Shuford Hardware Company is alluded to. The manner in which they are referred to indicates the appreciation in which they are held and the enterprise with which they are conducting their business.

The trade will observe on page 73 the advertisement of Henry Disston & Sons, Philadelphia, in which they illustrate some of their leading saws, and call attention in an effective way to their well-known line. It is also mentioned, it will be perceived, that their publications "The Saw," "Pocket Edition of the Sawyer," and "Lumbermen's Hand Book," will be sent on request.

Hibbard, Spencer, Bartlett & Co., Chicago, have issued a neat little pamphlet descriptive of Shepard's Lighting Ice-Cream Freezer which they handle. A convenience to dealers is furnished on page 2 of the pamphlet. This is a number of cuts showing all the parts of the Freezer, numbered and named, so that repairs can be

ordered without making mistakes. Full price-lists are given both of the several styles of Freezers and repairs. Useful recipes form a large part of the contents of the little volume.

The trade will observe the advertisement on page 94 in which the Northern Refrigerator Company, Grand Rapids, Mich., call attention to their line of cheap Hardwood Refrigerators. An illustration is given of one of their leading patterns. The comparatively low figures at which these goods are offered is one of the points emphasized in regard to them.

Thomas H. Chubb, Post Mills, Vt., sends out a circular relating to his catalogue which is now ready and referring to some features of its interesting contents.

The following item appeared in a recent issue of a Western paper:

The Iron Age was delayed by the high water and prevailing winds yesterday. She was expected in at noon to take out the remainder of her tow for St. Louis. She will not be here until to-day.

Goshen Buggy Top Company, Goshen, Ind., issue a variety of leaflets calling attention to some of their leading goods, giving advices in regard to their prices and also blank forms for convenience in ordering.

The disastrous fire by which the factory of the Rochester Steam Gauge and Lantern Company, Rochester, N. Y., was destroyed in November, 1888, with a loss of 37 lives, is recalled by a decision which has recently been rendered against the Steam Gauge and Lantern Company, of Syracuse. An action was brought to recover \$5000 on account of the death of an employee in the above fire, but when the case was argued January 28 Justice Rumsey, of the Circuit Court, granted a non-suit. The defendants' attorneys made the point that no evidence had been produced by the plaintiff to show that the employee whose death was the subject of the action had endeavored to leave the building by any of the fire-escapes with which the building was provided. Justice Rumsey held that the point was well taken, although as far as he knew there was no precedent for it. This is regarded as an important decision, as there are 20 suits of the same kind pending against the company, and this suit was a test case.

The trade will be interested in the announcement made on page 63 by Haydock & Bissell, 12 Murray street and 15 Park place, New York, in which attention is called to an important auction sale of Table and Pocket Cutlery, Plated Ware, Scissors, Shears, &c., which takes place at their rooms, on Wednesday, Thursday and Friday, February 12, 13 and 14.

Sullivan Hardware Company, Anderson, S. C., have issued a cloth poster, in which illustrations are effectively given of Agricultural Engines, Boilers, Cotton Gins, Cotton Presses, Windmills, &c., and attention is called to the fact that they are prepared to give prices and terms on all kinds of Machinery.

The well-known line of Cork-screws manufactured by C. T. Williamson Wire Novelty Company, Newark, N. J., are sold at discount 33 $\frac{1}{4}$ to 33 $\frac{1}{2}$ and 5 per cent. Their Handy Hat and Coat Hooks and Steady Ceiling Hooks are quoted at discount 50 and 10 per cent.

Canvassing for Trade.

A recent issue of our Canadian contemporary, *Hardware*, contains a discussion in regard to the advisability of retail Hardware merchants canvassing for trade, indicating that this is done to ascertain extent with the result of demoralizing

prices. On this subject the following editorial remarks are made:

Each individual member of any trade should feel that a portion of the total interests of that trade is in his hands. He should regard it as to his advantage to help to maintain the general interests of that trade. If they are neglected equally by him and all his fellow-tradesmen, because of a blind pursuit of merely personal prosperity, the trade itself will be ruined and personal prosperity will not be secured. No man, therefore, should resort to any practice which, tried by the principles that make general trade possible, is found to be wanting. It is not enough that the practice should seem to advance the business done in a particular shop. It must be approved by the conscience of the trade. In every business there are certain well-understood laws, most of them corollaries of the maxim, "Live and let live." These, like physical and civil laws, have a double function—they restrain and they protect. There are some people of such a low order of intelligence that they look upon law as only restrictive. They see no advantage to themselves in the upholding or respecting of it. They are outlaws by nature and usually by practice.

The fundamental principles of every business, we repeat, should be kept inviolate by every member of that business, no matter if by the breaking of one of them any immediate profit is gained. Retail Hardware dealers have their unwritten laws, and we think that among them is one which forbids canvassing for trade. That such a law does exist and influence trade is shown by the conduct of all reputable dealers. These are the great majority. If no such implicit prohibition were not very commonly obeyed the Hardware trade would not be to-day even what it is. Low prices, poor goods, feverish competition, misrepresentation, compromises, the departure of business to other places, would be the chief elements in the caldron into which general canvassing would soon throw our Hardware trade. The public would be dissatisfied, dealers would make nothing and no purpose would be served, but much damage accomplished. These are times when the doctrine of conservatism needs specially to be preached. The foolish mimicking of the so-called enterprise of our neighbors, which is becoming so common among our shallower business men, has a right to be condemned for their own good and for the general benefit. Canvassing for Hardware trade is wrong and dangerous.

Writing on this subject a Toronto retailer thus refers to the injurious effect the practice will have upon the dealers' profits, and at the same time makes a point against the wholesalers who in some cases deal direct with consumers at prices that closely approximate those paid by the retailers:

If it is true, as you say, that some retail Hardware merchants have canvassers offering goods outside for less money than is asked for the same behind the counter, then we may look for demoralization in prices.

Every man has a right to conduct his business as he thinks best for his own interests, provided it is done honestly and the goods are promptly paid for, but clear-headed business men always look ahead and they can generally see that a certain course pursued by them might for the time pay, but eventually that course if persisted in will cause loss and perhaps ruin. So in this practice of canvassing and cutting prices it may pay for a time and money may be made by it, but soon other dealers will follow suit, and the result will be a general lowering of prices and demoralization generally.

I would not condemn canvassing by the retailer if he can do it fairly and stand by

the regular prices. His right to canvass for the sale of his goods is just as good as the wholesaler, but the difficulty in doing a retail trade by canvassing and maintaining prices is extremely hard and should be avoided if possible. The fact that it is not usual for a retailer to offer his goods in this way leads the buyer to think that trade is dull and the goods must be sold, therefore the buyer thinks he can buy at his own prices, and probably does. It is

rack which is used for accommodating Lead Pipe.

The shop is on the fourth floor of the store building and is devoted to tanners, sheet-iron workers and plumbers. Great care has been taken to place the tools in the most convenient positions. Each workman is provided with an upright tool-case in front of him, and also with a drawer under the bench. Each man has his own closet for clothing, as clearly shown in the

connected with all parts of the establishment by electric bells and speaking-tubes. The shop is lighted by gas and incandescent electric lights and is heated by steam.

The fitting-bins in the plumbers' room are marked with figures on the side and letters on the top. A complete table hanging near by gives the exact place for every odd fitting. The brass-goods-bins, containing bibbs, valves, &c., have covers at the top to keep them closed. The side pipe-rack is made of 1½-inch iron pipe driven at an angle into stout timbers, and hold 15 different sizes of pipe laid horizontally. The metal-pipe rack holds pipe on shelves in a form to be readily seen. The two vise-benches are made of heavy timbers and firmly bolted to the floor. Shelves and bins for a great variety of goods over benches and doors and stairway, also closets, have been found impossible to show in the drawing. The hydraulic elevator with which this shop is provided was made by the Washburn Shops, of Worcester, Mass., and is very satisfactory in use. With a street pressure of 65 pounds it raises 600 pounds to the sixth floor at an expense of not over 1 cent for the trip. Many features are shown in the plan which the reader will find it interesting to study, and of which, therefore, further description is scarcely necessary. The rack for lead pipe shown in the second view is also self-explanatory. A differential pulley-block is employed in hoisting the reels into place. For this purpose a chain is put around the reels to grapple.

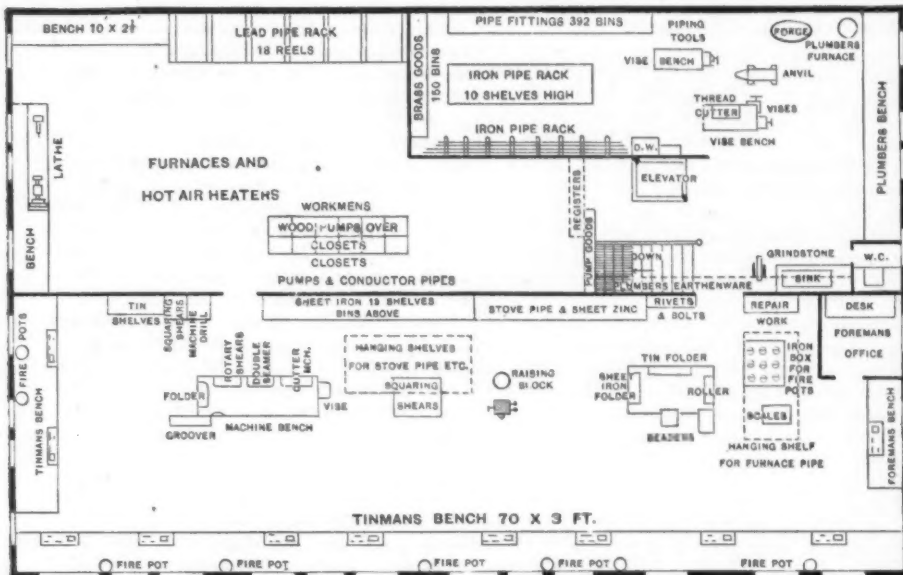


Fig. 421.—Shop of W. D. Parlin, Natick, Mass.—Floor Plan.

easy to see where this system of doing business will end, but it will then be difficult to mend it.

While doubting the wisdom of canvassing by the retailer, what are we to think of the wholesale man canvassing the consumer? It is generally supposed that the manufacturer or wholesaler confines his trade to the retailer, and does not go outside of this class for business. Those who think so will be surprised to know that we have manufacturers who hold out one hand to the retail dealer, and with the other offer goods to the consumer at prices that the dealer cannot sell at and live, yet these men expect the retail trade to support them while they are persistently doing their best to take the trade that is theirs legitimately away from them.

I hold that the wholesale men and manufacturers should stand by the retail men. These are the men they have to depend upon for the distribution of their goods among the consumers; they should cultivate their good will and assist them in putting a stop to a system that is demoralizing to the trade.

We retail men feel sore upon this point. We are the sufferers, and certainly we cannot look upon men who are guilty of such conduct with very friendly feelings.

Arrangement of Stores.

The accompanying illustration, Fig. 421, represents the shop in connection with W. D. Parlin's extensive establishment, Natick, Mass., of which we recently gave a description. It will be observed that this shop is exceptionally large and complete, and a careful study of its arrangement will doubtless be suggestive to many of our readers. We shall be gratified also to hear from the trade with suggestions in regard to the arrangement of shops in connection with Hardware stores, and shall be glad if some of our readers will furnish us with information in regard to their shops, as this is a matter of interest to many in the trade. Besides the diagram showing the arrangement of Mr. Parlin's shop the trade will observe Fig. 422, the

plan. The odd stakes are kept in holes cut in a square post placed near the center of the room. It is surprising how compactly odd-shaped stakes can thus be put away. A square sheet-iron box is provided for holding the outside fire-pots when they are in the shop as a guard against fire. The patterns are hung from

Credit Bureaus.

Almost every line of trade, sooner or later, experiences a want which is expressed by some such phrase as a "credit bureau." Each merchant has his own credit department, more or less distinct from other parts of his business, as determined by the size of his trade and the general organization maintained, and when he reflects that every other man in the same line of business is doing the same

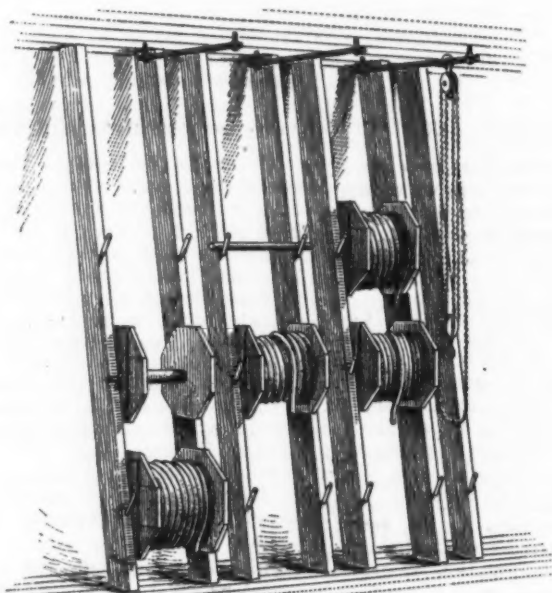


Fig. 422.—Arrangement for Lead Pipe in W. D. Parlin's Shop.

the ceiling in a row the whole length of the shop over the benches. They are marked in plain letters and their position is also indicated by marks on the ceiling. Hanging shelves composed of iron pipes run through the middle of the shop and hold tin furnace-pipe and sheet-iron smoke-pipe. Tin, sheet-brass, copper and other similar materials are kept under the tool-benches on shelves. Sheet-zinc is under the elbow-bins. The foreman's office is

thing, using practically the same names and employing the same general methods he is very likely driven to the conclusion that a single credit department conducted by a disinterested person for the benefit of his trade as a class would not only be a great convenience, but also an important economy in the business. Further he is led to reflect that what he knows about any one customer, is very likely to be erroneous in some important particular

owing to the way in which information is ordinarily secured, and that accordingly if the record as far as that man is concerned could be based upon the reports of a number of houses doing business with him it would be far more reliable. He becomes quite enthusiastic. He continues to build the air castles. "Here are six of us in the same business," he says, "all covering about the same territory. Now, if I should report to the central credit bureau all I know about each of my customers and each of the other five should do the same about theirs, and these reports should be carefully collated and arranged, the loss from bad debts both to myself and my competitors would be very much reduced. My expenses would be lessened, for it does cost money directly and indirectly to watch so many customers, to know at all times just what their standing is, and one well equipped credit bureau could do it for all of us, at far less expense than the aggregate cost of each doing it for himself."

So far so good. The merchant at once talks to his competitors in the same line of trade and after a time the majority of them are persuaded it is a good move and accordingly the bureau is organized and starts off with a grand flourish. But we will stop right here with our fable and complete the picture by a statement of facts illustrating how such things almost invariably work out. A local association of certain manufacturers was formed several years since, comprising in its membership ten or a dozen firms. The territory covered by these several manufacturers was very nearly identical, and the lines of goods manufactured by them more nearly corresponded in general features than is usual in such cases. The object of the association was, of course, to serve general interests. The question of prices was to be fixed from time to time, and incidentally the members agreed to sustain a co-operative credit bureau. Each was to contribute to this at the outset a list of his customers and to answer concerning all of them several questions with respect to standing, business habits, and general record, and from time to time thereafter was to send in reports of customers who failed—who allowed drafts to be returned and who did anything whatever calculated to influence their credit rating. In turn, each manufacturer was to have the use of all the records of the bureau in establishing his own scale of credits. Very elaborate and in all respects adequate preparations were made for the receipt of this information and for carrying out the scheme in all its details, but somehow it failed to work. The original lists were sent in—in part at least—but right there the machinery came to a stop and it has never moved since. No one of the dozen manufacturers has ever reported a customer delinquent or slow, or bankrupt, or anything else, and yet the trade of the district referred to goes on just the same.

One of the manufacturers interested in this scheme showed us a few days since the books and records of the bureau. He gave the information on which the above is based and many other interesting facts, to only one of which will reference be made at this time. Turning to a name, he said: "There is a customer who is rated 'fair pay' by one of the manufacturers in this little scheme. We know he is not fair pay—not by any means. We know he has no claim whatever to credit. We know further that he is 'into' the firm reporting him 'fair' for a large amount, which they have been carrying for a long time, and that they are seeking some way to get out. They would no doubt like some of the rest of us to help sustain the burden, and that was the reason of rating this man 'fair pay.' As it is, knowing all the facts, the rest of us sell him for cash only. The other concern can't unload on

us in that way." This tells the whole story, and the other facts presented in the conversation only corroborated it.

Competitors are competitors. They are never partners, and in the struggle for existence or for profits, as the case may be, there is no hesitation among competitors to choose the best for No. 1, leaving the poorest for No. 2. The history of various trades shows wrecks of enterprises of this kind all along the road, and where better results have been secured than those described it has only been by taking the credit bureau further away from the intimate association usually attempted and making it nearer an independent business effort. Here, however, success is by no means assured, for with the improvement and development of the general commercial agencies the last few years they offer facilities which special agencies cannot furnish, and their cost to subscribers is relatively far less than the cost of any special effort that can be made. The idea in starting a new credit scheme for any branch of trade is, "We will have it all to ourselves. We will weed out the irresponsible and tricky retailers, who cheat us out of our goods. We will establish a black list, &c." It don't work that way. The man that is first caught does not feel disposed to stand the loss. His leading thought is to unload, and he succeeds in this so often as to come to consider the provision or at least opportunity for unloading a necessary and proper part of good business management. Agreements may be made to do differently, but human nature is stronger than any agreement that can be made, and human nature, after all, is the ruling power.

REVIEW OF THE WHOLESALE MARKET IN PAINTS AND OILS.

It should be understood that the prices quoted in this column are strictly those current in the wholesale market, and that higher prices are paid for retail lots. The quality of goods frequently necessitates a considerable range of prices.

Paints and Colors.

For the first week of February business has been remarkably good, both in the more staple lines of Paints and in some specialties. Like those of the preceding three or four weeks the orders have run chiefly on moderate quantities, but the small orders have exceeded the average in number, making altogether a remarkably good total. Steadiness still characterizes values pretty much all along the line, as far at least as goods of standard quality are concerned, and the situation is satisfactory in this respect as well as regards volume of business.

White Lead, &c.—Manufacturers note a remarkably even movement of White Lead, including rather more than the average small orders from day to day in addition to the deliveries making on prior sales to large buyers. The distribution by jobbers continues good also. Trust prices are maintained by the leading manufacturers and their products are not sold below the official prices by jobbers. Outside brands are still offered with some liberality and all manner of prices, according to the character of the article, and some new substitutes are pushed forward for which a great deal of merit is claimed by the makers. Although doubtless larger than ever before, the outside competition does not appear to cause the trust concerns any uneasiness. Red Lead and Litharge have been moving in about the usual way at steady prices.

Six local White Lead manufacturing concerns, the Jewett, Union, Ulster,

Brooklyn, Bradley and Lenox, are about to be amalgamated, to the end of more economical management. The trust officials will likely close some of the establishments down.

Zincs.—There has been no remarkable change in the market for American Oxide. Current sales are very fair and the deliveries good on contracts. Prices remain very steady on all grades. Foreign Zincs are very firmly held and selling to a fair extent.

Colors, &c.—The condition of the market for the leading lines of colors adapted for house-painters' use is much the same as for several weeks and nothing of unusual character transpires in the line of grinders. Business appears to be very fair, at all events, and prices quite steady.

Ready-Mixed Paints are selling quite freely. Inferior qualities of these and Paste Paints have a slightly disturbing influence in some quarters, but reliable goods are not only holding their own, but making headway.

Miscellaneous.—Chalk is in moderate supply on the spot and \$1.75 @ \$2 is now about the value. Whiting has met with fair sale, Common at previous figures and Gilders' at a slight concession. Paris White and Barytes without change.

Animal and Vegetable Oils.

There have been few changes in the market for this line of goods. What fluctuations in prices have taken place were within narrow bounds for the most part, and the general situation at the present time differs in no remarkable degree from that of a week ago. The volume of business in the leading articles has been rather larger if anything, and the demand from home and export buyers is of good volume, affording reason to expect continuation of present steadiness of values. There is a probability of higher figures ere long for Linseed Oil, and the outlook on Cotton-Seed Oil is considered more favorable.

Cotton-Seed Oils.—Transactions in crude have been quite liberal, and include at least 2000 barrels on the spot, nearly all of which went at 28¢. Exporters have purchased fully 3500 barrels Summer Yellow here at 34¢, in addition to very fair quantities in the Southern market. Home distribution has been up to the average. The general position is believed to be much stronger than a week ago.

Linseed Oil.—Sales of city made product have been rather larger, and receipts from outside points show more or less falling off, owing to the fact that relatively better prices prevail in the Western markets. Along with the continued high cost of raw material, this adds strength to the opposition here. Crushers have as yet made no change in their prices, but an early advance is considered probable.

Lard Oil.—The market is a trifle easier and rather dull. Ordinary lots of best brands of city prime are now offered at 52½¢ and round lots can be had at 52¢ easily. Outside of a fair home distribution there is little doing.

Olive Oil.—Importers have had their price for Italian up to 88¢ on actual sale and 90¢ asked, but the market has since eased off somewhat and 85¢ @ 87½¢ are the top prices. The foreign market continues strong.

Sperm and Whale Oils.—There have been no transactions in crude Oils in the New Bedford market, and the position there is the same now as for some time past. The manufactured Oils continue to sell very fairly in a jobbing way in the local market at steady prices.

Menhaden Oils.—Home consumers have purchased about 1500 barrels crude and exporters moderate quantities at previous prices. The position remains favorable and prices for the manufactured product are steady.

The Fairmont Cream Can Gauge.

The Geuder & Paeschke Mfg. Company, Milwaukee, Wis., announce to the trade that they have purchased from Houghtaling & Sinclair all their rights to and interest in the Fairmont Cream Can Gauges, and that they are now sole manufacturers of them. This gauge (views of which are shown in the accompanying il-

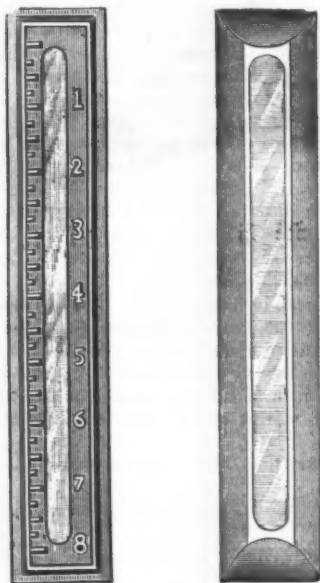


Fig. 1.—Front View. Fig. 2.—Back View.

The Fairmont Cream-Can Gauge.

ustrations) is said to possess many advantages. As there are no corners, it is easily cleaned and the cream has no place to collect in and turn sour. Furthermore, the gauge is readily attached to the can, requiring but little fitting or backing, and is said to be very durable. A front view of the gauge is shown in Fig. 1, while the second illustration presents a back view.

Fun in a Western Store.

A correspondent in Waynesburgh, Ohio, sends us the following:

In reading a recent interesting article by Knarf on "Western Stores," it struck me that some of the fun as it occurs in these self-same stores could be taken as a relish with the more solid news usually contained in *The Iron Age*. The woman that asked me if I kept "granulated kettles," and was satisfied with a granite kettle, is but one of the funny incidents of that nature. I have had a most laughable experience with a Dutchman named Joseph Oswalt. The first time I met Joe he came rushing into the store. "Is Bonbrake here?" he inquired. "Yes, I am the man." "Vell, you to look like a pone-proker, aind id?" "Can I do anything for you?" "Yaas, I want to ged some stove-pipes." "Well, what size do you want?" "Vell, py the size of mein eye, I dink id vas aboud eleven inchens one vay und aboud thirteen inchens the under way." I concluded he wanted the largest size (7-inch pipe), and asked him how long he wanted it. "Vi, I want to py id und keep id till id vas vorn out." "Yes, yes," I said, "but how many joints do you want?" "I vant dree feet dree inchens und a half und a hellabode." I had his pipe ready in a short time to suit him, and off he started over the hills on his seven-mile drive home. That evening while eating supper there came a thundering rap at my front door, and when I opened it there stood

Joe with fire in his eye. "Pone-proker, for vat you make me coomd clear pack here mid dem pipes for?" "Why, what's wrong, Joe?" "Did'end I told you mine stove vas not round? Id vas flat!" I saw the point at once and asked Joe if he had brought the pipe with him. "Yaas, I haf id in der vaggon." I went with him to the wagon, got the lower joint and gave it a good rap across the hind wheel, which mashed it nearly together. Joe looked on in open-mouthed wonder, and when I threw the joint back into the wagon he said: "Mein Gott!"—not another word, but off he started.

Jake Miller came into the store one day not long since, while I was trying to sell a granite teapot to a couple of ladies. Now, Jake, in his make-up alone, is funny enough looking, and his appearance caused a smile to ripple across the faces of my customers. "Can I show you anything, Mr. Miller?" He gave a wink and a half smile at the ladies when he said: "I bed I know somedings vat you can't show me." "What is that?" "A tousand tollars;" and then he laughed as he thought the old "chestnut" a good one. "Well, what can I do for you?" "I vant to gid a—vant to gid a—a— Oh! I don'd know vat!" "Well, what is it for, maybe I can help you out." "Id vas for a stove!" "Well, what part of the stove?" He took the cover off a cook, and as he majestically waved his hand toward the back wall, he exclaimed: "Id vas der pack side, der pack side of der stove I vant!" It was too laughable; I had to more than smile, as did the ladies; they however concluded to retire and finish the purchase at some other time. "What is the name of your stove, Mr. Miller, and who is the maker?" "Id vas an Allcock stove." "A what?" I asked in wonder. "Id vas Allcocks stove." "You must surely be mistaken." No, I vas nod, Allcock vas on der heardt." Now, there used to be a porous plaster made by a man of that name and Hitchcock, Carter & Co. used to make stoves in Cleveland. Just then an idea struck me; his was a wood stove, and evidently some rooster had made it. I joined the wood to the rooster and asked Jake if it was not "Woodcock" that made his stove. He was the man. I sent to J. M. Woodcock, got a back wall for Olive Branch, and Jake is happy.

Christ. Cline is a very precise man. An agreement once entered into with him must stand "if the world fall," and even if it is to his disadvantage as was the case with me. I went to see Christ. and contracted to spout his barn. After looking it over he asked me what it would cost. I told him about seven dollars and a half, but it would be 10 cents a foot. After the spouting was up and all finished, I asked him to hold the tape until I measured it. "For vat you do dot?" asked Christ. "So I can tell what to charge you." "Vell, but saven tollars und a half is vot you said." "I said ten cents a foot, and it would be about seven and a half." While we were talking I was measuring. "Nine, nine! Saven toller und a half vas vat you said, and I pays you nix more." I had gotten through measuring, and found only seventy-three and one-half feet, and I says: "Christ., this work by measurement only comes to seven dollars and thirty-five cents." "Id done make any difference, saven tollars und a half is vat you said, und here id vas. Now coom and ged yourself some ci—der, id vas ninety gallons biled down to dirty und dree years olt."

We are informed that the Bessemer Association, Limited, owners of the basic patents, demand, on account of royalty, before the issue of a license, sums varying according to the magnitude of the work, from \$50,000 to \$200,000.

Improved Stove-Lid Lifter.

L. M. Devore, of Freeport, Ill., is introducing to the trade a lid lifter, provided with what he is pleased to term a non-heating wire handle. A general view of this device is afforded by means of the accompanying illustration. The handle, it will be seen, is constructed of coiled wire in such a manner as to present very little heat-conducting material in comparison with its radiating surface, thus reducing the liability to become hot to the hand. From an inspection of the engraving it will be noticed that the wire of which the handle is composed is coiled around a central rod, the free end of which is supported by an elongated bearing attached to the boss of the lifter. This construction, the manufacturer states, gives the device great strength and stiffness against lateral pressure, while at the same time



New Lid Lifter.

producing a smooth handle of convenient shape. The spiral handle may be applied not only to stove-lid lifters, but may be used in connection with cooking utensils of various descriptions. The manufacturer calls attention to the fact that this handle is much less liable to become hot than other wire handles, owing to the fact that only one end of the wire coil is attached to the iron portion of the lifter.

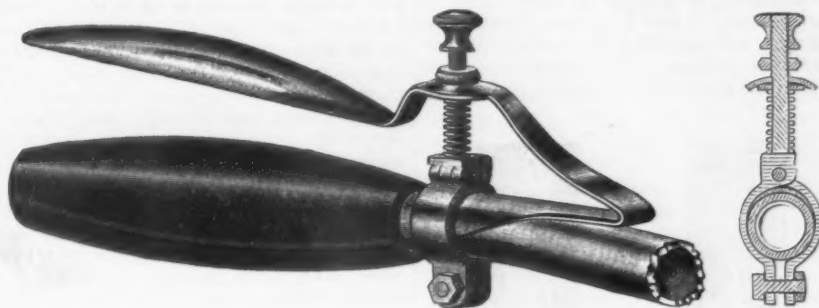
The Link-Belt Machinery Company, of Chicago, have received permission from the State authorities to increase their capital stock to \$250,000. The Crane Bros. Mfg. Company will also increase theirs to \$2,500,000.

New Hog Rings and Ringers.

The accompanying illustrations represent the new line of goods put on the market by the St. Louis Screw Company, St. Louis, Mo. They are called the Top of the Hill Hog Rings and Ringers, and the illustrations show the rings open and closed and the ringer by which they are applied. The manufacturers call attention to the fact that most other rings close and meet in the flesh of the hog's nose, which causes constant irritation whether the hog attempts to root or not, and they point out that in this ring this objection is overcome. It will be observed that there is a long and a short barb, the long barb passing entirely through the flesh and the short barb being in position outside the nose to keep him from rooting and at the same time leaving him at ease when not rooting. Fig. 1 shows the form in which these rings are furnished, being made with a partially formed bend which greatly facilitates closing, and Fig. 2 showing the form of the ring when closed. The ringer which is especially adapted for closing these rings is represented in Fig. 3. The company call attention to the advantages possessed by these goods. They also offer to

adding to the elasticity, also permits of the springs being adjusted to suit the hands of the different riders. This adjustment is accomplished by means of a check-nut immediately over the flat spring, a second

being scooped out leave it so shaped that the sides recede and offer no friction or resistance as the axe cuts into the wood, and that consequently it will cut deeper into the wood than the regular pattern. A careful inspection of the cut will show



The Eureka Anti-Vibrator.

nut on the upright rod preventing the loss of the check-nut and adding to the handsome appearance of the spring. This anti-vibrator can be placed on the handle-bar of any bicycle in the market. The illustration shows the anti-vibrator as ap-

plied to the central ridges of the blade are triangle-shaped. This is referred to as bursting the chip, and it is stated that no matter if the axe is driven to the eye in the wood it cannot stick or bind in the timber, but can readily be loosened without breaking or bending the handle. Another advantage resulting from the sides of the blade being thin is that the axe does not become stubbed as it wears away, but can be kept in order and nearly the original shape by merely grinding the cutting edge. The axe is described as made entirely of steel, the pole being of soft steel and the blade of the finest grade extra double refined cast steel. It is forged and tempered with natural gas, and the company allude to this heat as giving a better temper than can be obtained from charcoal or any other fuel. The axe is thus put on the market with high claims as to the excellence of its shape, which is regarded as giving important advantages over others, and also with claims as to its excellence of material and workmanship. We are advised by the company that they are receiving many letters from practical woodchoppers which express their satisfaction with it, and indicating that its use is attended



Fig. 1.



Fig. 2.

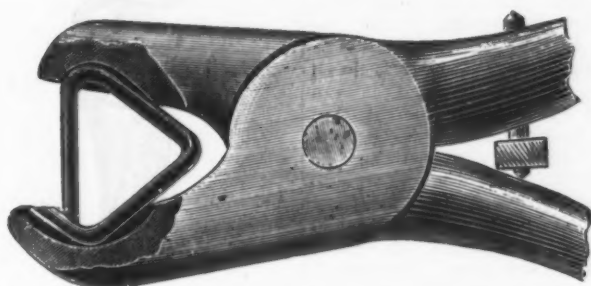


Fig. 3.

New Hog Rings and Ringer.

make liberal terms in accepting other ringers in part payment of goods purchased from them.

The Eureka Anti-Vibrator.

The Cycle Improvement Company, 659 West Harrison street, Chicago, are putting on the market the patented device herewith represented, the Eureka Anti-Vibrator. It is designed to prevent the vibration and bumping of a machine, which jars the rider and causes the hands to become callous and stiffened. From the accompanying illustration it will be seen that this appliance consists of a clamp hinged in the center and a flat steel spring. The clamps are for a double purpose, to hold the lower part of the flat spring which partly encircles the handle-bar, and also to support the rod which is used as a guide for the flat spring and holds the spiral spring. The flat spring is described as made from the finest spring steel, but in a manner which gives the greatest elasticity, and the point is made that the hand rest conforming exactly to the handle of the cycle does not tire or pinch the hand resting on it. The part of the spring encircling the upright rod is reinforced by a coil spring, also of steel which, while

plied to a straight grip handle, but the company can supply them for any handle, straight, spade, T or pear shape. The springs are nickel-plated and handsomely finished, and are alluded to as adding greatly to the attractiveness of any machine. The efficiency with which the appliance accomplishes its object is alluded to. They retail at \$6 per pair.

The Perfect Axe.

The accompanying illustration represents the pattern of axe which the Kelly Axe Mfg. Company, Louisville, Ky., are now putting on the market. It will be recognized as an important modification of the shape of axe which they have been making since 1885, the machinery for its manufacture having only recently been perfected. The axe is the invention of W. C. Kelly, who is a son of William Kelly, the inventor of the Bessemer process. It is obvious that to make a blade of the shape shown in the illustration, scooped on the sides, presented some practical difficulties, but these, we understand, are entirely overcome and the goods are now being put on the market. In regard to the advantages of this shape of axe it is pointed out that the sides of the blade



The W. C. Kelly Perfect Axe.

with much less fatigue than the ordinary axe, the reason being, as they express it, that the axe cuts deeper into the wood with less labor and is easily extracted.

The South African Company are about to construct a railway to Bechuanaland, the first link in a trunk line to the Gam-besi River. Simultaneously with this announcement a St. Petersburg paper advises a general continental policy antagonistic to the further extension of British dominion in that direction. German schemes, on the contrary, are favored.

The Guiding Star Lamps.

The accompanying illustrations represent a new line of lamps for bicycles and tri-cycles which are put on the market by the Cycle Improvement Company, 659 West Harrison street, Chicago, Ill. Two illustrations showing different views of these lamps are herewith given. The lamps are described as made of heavy selected brass with the parts securely riveted and possessing in addition to recent improvements in such goods, such new and valuable features as, a heavy cut-glass front, ruby and emerald side lights, parabolic reflector, large oil reservoir, self-detaining wick adjustable from the outside, improved draft and coiled wire spring back. Their noiselessness and the fact that they can be lighted from the outside are also to be mentioned. The following more detailed information given by the company in regard to their lamps will be of interest:

We use a new pattern of coiled wire spring back for anti-vibrating purposes, which is simple and effective, doing away with the heavy and unhandsome devices used by other lamps, and being perfectly noiseless. Having personally given these lamps tests which they would never be subjected to in legitimate riding, we can positively state that they will not jar out.

These springs are further fitted with duplex adjustable clamps fitting any bracket in the market. We use in these lamps a heavy beveled lens of the finest French plate, having a leather cushion around the edge protecting it



Fig. 1.—Guiding-Star Lamp, Front View.

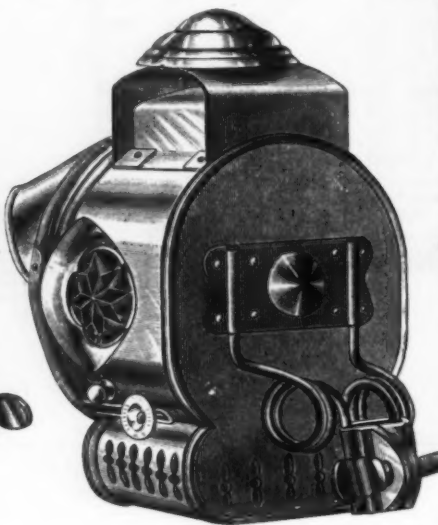


Fig. 2.—Guiding-Star Lamp, Rear View.

from blows. These lamps are provided with red and green side lights, fitted with reflecting hoods throwing the light back. In place of the usual plain glass we have substituted heavy plate cut and faceted resembling jewels and giving a flashing light much more attractive than a plain color. One of the most essential features of a lamp is the reflector, and in this respect, as in others, our lamp is the peer of all others.

As will be seen in the sectional cut, we use the well-known parabola shape, which is used whenever the greatest light is desired. This reflector extends from the back nearly to the front of the lamp, and on the door is placed a rim or continuation of the reflector, thus giving a reflecting surface of greater depth than the lamp itself. As a result of this large reflecting surface and after repeated trials made we guarantee that these lamps will throw a more brilliant light and farther than any other lamp made. The oil reservoir is of extra large size, entirely filling the bottom of the lamp and extending up to the base of the reflector, and fitted with a regular lamp burner improved and made especially for these lamps. These burners screw into the lamp and cannot possibly jar or fall out. The wick can be lighted, adjusted and extinguished from outside and is self-detaining—an important feature. The draft is well arranged, giving increased combustion and consequently greater light. The edges of the lamp are raised or crimped, insuring them from injury in case of a fall. These lamps are made entirely of brass and handsomely nickel-plated inside and out, and also finished in enamel.

The lamps are made in four sizes as follows: No. 1, regular, nickel-plated;

No. 2, regular, enameled; No. 3, boys' size, nickel-plated; No. 4, boys' size, enameled.

The Success Door Spring.

We illustrate herewith a new door spring which has been brought out by the Freeport Hardware Mfg. Company, of Freeport, Ill. This spring is very simple



The Success Door Spring.

in construction, and is so plainly shown in the cut that it needs but little description. It is so made that it can be unhooked and rehooked in an instant from the door and also from the jamb without the trouble of removing a screw or even a pin.

Connelly's Improved Plumbers' Blast Furnace.

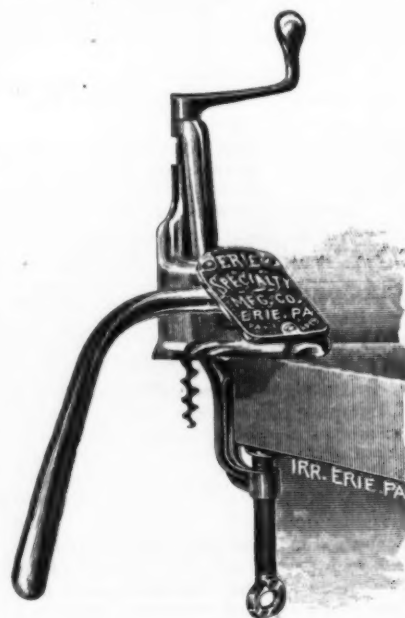
Thomas Connelly, 903 Filbert street, Philadelphia, Pa., is the manufacturer of

changes have been introduced, and lately a number of improvements made in the old form. As now manufactured the furnace consists of a sheet-iron base or reservoir, spun into proper shape, to which are securely riveted the standards for supporting the top. The top is made of cast iron with its upper edge scalloped so as to prevent the soldering coppers from rolling or sliding out of position. It is also of suffi-

cient size to hold a large solder or lead pot. This part of the furnace was formerly made of sheet iron, but it has been discarded and cast iron substituted, because the former would not stand the rough usage it received. The top can readily be removed if necessary, as it is simply attached to the standards by machine screws. The principal improvement, however, to which the manufacturer refers is the burner. In the old style it was found rather difficult to keep the tip clear of scales, dirt, &c. The new burner is made in such a way of malleable iron with a straight pipe for the oil supply and another straight pipe for the tip that no bends are necessary, and it is said that no clogging takes place. The manufacturer also alludes to the brasswork used on the furnace as being of specially good quality. The height of the furnace is 14 inches and it weighs 6 pounds. The manufacturer writes that there are no fancy points about it, but the design of every part has been carefully considered and wherever possible improvements have been made.

Walker's Improved Cork-Puller.

This article is manufactured by the Erie Specialty Mfg. Company, Erie, Pa., and it will be observed that important



Walker's Improved Cork Puller.

a blast furnace for plumbers' use, the general appearance of which is shown in the accompanying cut. This furnace in its



Connelly's Improved Plumbers' Blast Furnace.

general form has been on the market some time, and, in fact, the first patent is over ten years old. Since then, however, many

improvements have been made in it. As offered this season it is attached to the table by means of a clamp, as shown in the accompanying illustration, instead of being fastened with screws as made last season. The company allude to the efficiency with which it does its work.

The North Star Refrigerator.

We illustrate herewith some of the leading features of the new line of refrigerators now being put on the market by Geo. M. Shirk, 112 and 114 Lake street, Chicago, manager of sales of the Indiana Mfg. Co., of Peru, Ind. The illustrations embrace a broken view, Fig. 1, of a North Star Refrigerator, showing the system of air circulation; Fig. 2, a sideboard refrigerator, showing the construction of the drain trough, and Fig. 3, a cut of the style of leg used. With regard to the air circula-

frigerators manufactured by the company is carried at their office and warerooms in Chicago.

Lifter for Hot Dishes.

W. J. Clark & Co., of Salem, Ohio, are placing upon the market a device intended for use in the kitchen, and one which will

various forms and sizes of pie plates, cake pans and the like. Wooden handles are provided, substantially hinged together and so arranged as to automatically open by means of a steel wire spring. The manufacturers call special attention to the convenience of this device for the purposes named, its durability and the manner in which it is made. It is packed in



The North-Star Refrigerator.—Fig. 1.—Broken View.



Fig. 2.—Side-Board Refrigerator.

tion, it may be stated that these refrigerators have no filling whatever between their walls, which are constructed with three separate air chambers. The two outer chambers contain dead air, while the inner circulating space is connected with a ventilator in the lid which is intended to be kept open when not in use as a refrigerator. The inclosed air in the outer chambers insures protection of the contents of the refrigerator from outside heat, while the circulating space which extends on all sides prevents, it is said, any condensation in the provision chamber as well as entire freedom from moldy and

be appreciated by all who have anything to do with cooking. It is known as a hot-dish lifter, and is designed for handling plates, crocks and round and flat sided pans having an outside diameter up to 11

pasteboard boxes having a capacity for one dozen.

The Secretary of the Treasury has awarded the contract for constructing the

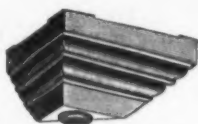


Fig. 3.—Refrigerator Leg.

disagreeable odors so common in refrigerators. It will be observed that the circulation extends through the doors and lid, as well as the ends of the case. The cut of the sideboard refrigerator, Fig. 2, shows the special drain trough, which is intended to carry into the waste pan all water used in washing out the provision compartment or any liquid which may be spilled accidentally, thus facilitating the labor of cleaning. The leg shown in Fig. 3 is made of solid ash and is fitted with the Fox patent socket for malleable iron casters. A full stock of the various re-

frigerators manufactured by the company is carried at their office and warerooms in Chicago.



Lifter for Hot Dishes.

lighthouse tender Marigold to the Detroit Dry Dock Company at the bid of \$77,000, and has rejected as unsatisfactory all the bids received for the construction of the tender Azalia.

The Fuel Question in England.

The London *Ironmonger* has collected the opinions of a large number of colliery owners on the burning question of the day, the fuel supply of Great Britain. We quote as follows from our contemporary:

For some time past there have been statements as to the alleged scarcity of certain kinds of fuel, but gentlemen of a "bearish" turn of mind have poohooh'd them, and have argued that the demand would certainly produce an adequate supply. Recent experience does not seem to have confirmed this impression, and many of the replies from colliery owners, published by us to-day, show that the demand for some grades of fuel is not only beyond the supply now, but is likely to remain so for some time to come. The general tenor of the questions we addressed to the colliery proprietors was to elicit the best possible information respecting the supply and prices of fuel in the near future. We sent our inquiries all over the country, and have been favored with a large percentage of replies, so that a perusal of them should certainly enable all who are concerned to form a pretty accurate opinion on this very important question. That opinion will be all the more reliable if the reports from our correspondents and those from the Continent and the United States are perused also. Taking a broad view of what we are told by the colliery owners, it seems to be held that present prices are fully warranted by the demand, and, indeed, that they are the legitimate outcome of a demand which is greater than the means of supply. To what extent the demand is in excess of the supply is not clearly determined—as might well be supposed—but many of our correspondents report that there is such excess, and some of them estimate it as high as 35 per cent. This is the case chiefly as regards fuel for manufacturing purposes and not in respect of house coal, the call for which has very naturally been lessened owing to the extreme mildness of the winter up to the present time. As to the probabilities of the supply of coal being increased, it appears to be clear that no such increase is at all probable, inasmuch as new pits cannot be sunk in a hurry, and even if they were available within a short time, there is not sufficient skilled labor to work them. For the same reason, the output of the existing mines is not likely to be augmented, owing to the operation of the clause in the coal mines regulation act which prohibits the employment of any man as a hewer of coal unless he has been employed in the mine for the period of two years in some other capacity.

There is a difference of opinion, we note, as to whether mining labor is or is not scarce. In some districts the question is replied to very decidedly in the affirmative, while other correspondents state that it is in adequate supply. But if opinion on this point is not unanimous, there is very little doubt, indeed, that the effect of the higher wages now being received by the miners is to lessen the efficiency of their labor and to limit their working days, thereby considerably reducing the total output of coal all over the country. Exceptions appear to exist in some parts of Scotland, the miners there being sufficiently canny and wise to "make hay while the sun shines." As to the supply of coke for blast furnace and foundry purposes, many of our correspondents are not able to reply authoritatively, but those who do answer the fifth question express varying opinions. Some of them believe, and for various reasons, the supply of coke will not be greatly increased, but others take the view that the high prices

now prevailing will gradually augment the output of coke. The action of the miners in demanding further advances has become more pronounced since our inquiries were sent out, and the point may be dismissed as being one generally known throughout the country. The men evidently mean to get all they can out of the period of prosperity, and to push their claims without delay. As to the conveyance by the railway companies of the coal traffic, there is evidence of great pressure in some parts of England and Scotland, and, in particular, it is demonstrated that the supply of wagons is very inadequate, and that more cannot be had because the wagon builders have already more work on hand than they can deal with promptly. Should a spell of sharp weather set in it seems to be held that house coals would experience a smart advance, but that little effect would be produced upon manufacturing fuel.

Having thus summarized the situation at home, we may briefly glance at the state of things abroad. In Belgium the colliers' strike is partially settled, but on a basis which must greatly augment the cost and reduce the output of all kinds of fuel in that country. In Germany the miners are again agitating for a large advance in wages and shorter hours. The effects of their strike in May last are shown by the statement that steam coal is now 12 marks, against 6.40 marks; coking coal, 12 marks, against 5.40 marks, and coke, 24 marks to 26 marks, against 9.50 marks, a year ago. As to the production, there are now 9000 more miners at work in the Dortmund district, but they produced almost exactly the same quantity as the much smaller number of men did in 1888. It is noteworthy, also, that in 1889 Germany imported of coal twice as much from Great Britain as in 1888. In France all fuel has increased greatly in price, and, as that country is largely dependent for its supplies upon ourselves and Belgium, it is obvious that the dearness must continue. In the United States anthracite coal is very dull, owing to the exceptional mildness of the winter, but bituminous is firm at full prices. In the coke trade a new scale of wages is about to be arranged, probably on a sliding-scale basis, but it is a significant feature to find that the men have already claimed an advance of 20 per cent. as the basis.

Steel Trusses for Masts.—There is no problem of greater interest to shipbuilders and owners along the Atlantic coast just now than that of devising a safe and otherwise satisfactory rig for the big four-masted schooners that have become so fashionable within the past three or four years. Instead of the long, thick, heavy spar rising from the midship line it is proposed to substitute two neat, substantial steel trusses. The trusses are to be built of three or four pieces of flat steel set edgewise to the side of the ship and united by angle irons riveted between them and by tie rods, which would make the truss at once light, stiff and symmetrical. Where the trusses meet at the cross-trees they would be riveted to a stiff steel cylinder in which the topmast would be stepped. From the heel of this topmast or from the steel cylinder in which it was stepped would be stretched a steel rope, the lower end of which would be set up in a stout eye-bolt set into a deck beam. The sail could be secured to this perpendicular stay by clips, just as yacht jibs are secured to a jib-stay. The boom and gaff would swing on metal collars put around the rope. The sail would swing to and fro as readily as it now does. The steel rope on which it swung if of proper size would stand a much greater strain than any wooden mast. Further to strengthen the trusses that at once replace mast and

shrouds, cross-plates, and tie-rods could be run from truss to truss, but if the truss-plates were made of suitable size and the size could be easily calculated, these long tie-rods would not be necessary.

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CURRENT HARDWARE PRICES.

FEBRUARY 5, 1890.

Note.—The quotations given below represent the Current Hardware Prices which prevail in the market at large. They are not given as manufacturers' prices, and manufacturers should not be held responsible for them. In cases where goods are quoted at lower figures than the manufacturers' name, it is not stated that the manufacturers are selling at the prices quoted, but simply that the goods are being sold, perhaps by the manufacturers, perhaps by the jobbers at the figures named.

Ammunition.—

Caps, Percussion, 1000—	
Hicks & Goldmark's and Union Metallic Cartridge Co.	
F. L. Waterproof, 1-10's.....	34@35¢
E. B. Trimmed Edge, 1-10's.....	46@48¢
E. B. Grnd. Edge, Cent. Fire, 1-10's.....	46@47¢
Blank Cartridges, 1-10's.....	50¢
G. D.....	28¢
S. B. Genuine Imported.....	45¢
Eley's E. B. Waterproof, Central Fire.....	\$1.60

Cartridges.

Rim Fire Cartridges.....	50¢&52¢
Rim Fire Military.....	15¢&2¢
Cent. Fire, Pistol and Rifle.....	25¢&52¢
Cent. Fire, Military and Sporting.....	15¢&52¢
Blank Cartridges, except 22 and 32 cal., additional 10¢ on above discounts.	
Blank Cartridges, 22 cal., \$1.75.....	2¢
Blank Cartridges, 32 cal., \$3.50.....	2¢
Primed Shells and Bullets.....	15¢&52¢
B. B. Caps, Round Ball, \$1.75.....	2¢
B. B. Caps, Con. Ball, Swgd., \$2.00.....	2¢

Primers—

Berdan Primers, \$1.00.....	2¢
B. L. Caps (for Sturtevant Shells) \$1.00.....	2¢
All other Primers, \$1.20.....	2¢

Shells—

First quality, 4, 8, 10 and 12 gauge.....	25¢&10¢
First quality, 14, 16 and 20 gauge (\$10 list).....	30¢&10¢
Star, Club, Rival and Climax brands.....	20¢&10¢
Setbold's Comb. Shot Shells.....	15¢&2¢
Brass Shot Shells, 1st quality.....	60¢&2¢
Brass Shot Shells, Club, Rival, Climax.....	65¢&2¢
1 X L, 10 and 12 gauge.....	40¢&52¢
"Special," 16 gauge.....	30¢&15¢&2¢
"Special," 10 and 12 gauge.....	40¢&10¢
Fowler's Pat.....	\$1.25

Shells Loaded—

Standard. List.....	40¢&40¢
Wads—Price per M.	
U. M. C. & W. R. A.—B. E., 11 up.....	68¢
U. M. C. & W. R. A.—B. E., 9&10.....	82¢
U. M. C. & W. R. A.—B. E., 8.....	96¢
U. M. C. & W. R. A.—B. E., 7.....	111¢
U. M. C. & W. R. A.—P. E., 11 up.....	115¢
U. M. C. & W. R. A.—P. E., 9&10.....	150¢
U. M. C. & W. R. A.—P. E., 8.....	170¢
U. M. C. & W. R. A.—P. E., 7.....	180¢
Eley's B. E., 11 up.....	175¢
Eley's P. E., 11 up.....	280¢

Anvils—

Eagle Anvil, 10¢.....	15¢&15¢
Peter Wright's.....	10¢
Armstrong's Mouse Hole.....	1¢
Armstrong's Mouse Hole, Extra.....	11¢
Trenton.....	11¢
Wilkinson's.....	9¢&10¢
J. & Riley Carr, Pat. Solid.....	11¢&11¢
Moore & Barnes Mfg. Co.....	33¢
Anvil Vice and Drill—	
Millers Falls Co., \$18.00.....	20¢
Cheney Anvil and Vice.....	25¢
Allen Anvil and Vice.....	40¢&10¢
Star.....	45¢&5¢

Apple Parers—

Advance.....	¢ doz 4.75
Antrim Combination.....	¢ doz 5.50
Baldwin.....	¢ doz 5.25
Champion.....	¢ doz 7.25
Daisy.....	¢ doz 4.00
Eureka, 1888.....	¢ each 17.00
Family Bay State.....	¢ doz 12.00
Favorite.....	¢ doz 5.00
Gem.....	¢ doz 5.25
Gold Medal.....	¢ doz 4.00
Ideal.....	¢ doz 4.00
Improved Bay State.....	¢ doz 30.00
Little Star.....	¢ doz 4.50
Monarch.....	¢ doz 13.50
New Lightning.....	¢ doz 5.50
Oriole.....	¢ doz 4.00
Penn.....	¢ doz 4.00
Perfection.....	¢ doz 4.00
Pomona.....	¢ doz 4.00
Rocking Table.....	¢ doz 6.00
Turntable.....	¢ doz 4.50
Victor.....	¢ doz 13.50
Waverly.....	¢ doz 4.00
White Mountain.....	¢ doz 4.50
72.....	¢ doz 4.25
76.....	¢ doz 5.75
78.....	¢ doz 6.50

Augers and Bits—

Douglas Mfg. Co.....	
Wm. A. Ives & Co.....	
Humphreysville Mfg. Co.....	70¢
French, Swift & Co. (F. H. Beecher, P. S. & W. Co.).....	
Rockford Bit Company.....	55¢
Cook's, Douglas Mfg. Co.....	55¢
Cook's, N. H. Copper Co. 50¢&10¢&50¢&10¢	
Ives' Circular Lip.....	60¢
Patent Solid Head.....	30¢
C. E. Jennings & Co., No. 10, extension lip.....	40¢
C. E. Jennings & Co., Auger Bits, 5¢ set, 32¢ quarters, No. 5, 8; No. 30, \$3.50, 20¢	
Lewis' Patent Single Twist.....	45¢
Russell Jennings' Augers and Bits 25¢&10¢	
Imitation Jennings' Bits.....	60¢&60¢
Snell's Jennings' Pattern.....	80¢
Fugh's Black.....	30¢
Rockford, Jennings' Pattern.....	30¢
Car Bits.....	50¢&10¢&60¢
Car Bits, P. S. & W. Co.....	60¢&10¢
Snell's Car Bits.....	60¢
L. H. Hommedieu Car Bits.....	15¢&10¢
Foreman's Pat. Auger Bits.....	10¢
Cincinnati Bell-Hangers' Bits.....	30¢

Hollow Augers—

Ives.....	35¢
French, Swift & Co.....	33¢&10¢
Douglas.....	40¢&10¢
Donney's Adjustable, 1/2 doz \$48.....	20¢&10¢
Ives' Expansive, each \$4.50.....	50¢&5¢
Universal Expansive, each \$4.50.....	20¢
Wood's.....	25¢&10¢
Cincinnati Adjustable.....	30¢&30¢
Cincinnati Standard.....	25¢&10¢

Expansive Bits—

Clarks' small, 1/8; large, 1/4.....	35¢&35¢
Ives' No. 4, 1/2 doz \$60.....	40¢
Swan's.....	40¢
Stearns, No. 1, 1/2; No. 2, 1/2.....	35¢
Stearns' No. 2, 1/4.....	20¢

Gimlet Bits—

Common.....	¢ gross \$2.75 @ \$3.25
Diamond.....	¢ doz \$1.10.....
Cleveland.....	25¢&10¢
Syracuse, for metal.....	50¢&10¢
Double Cut, Ct. Valley Mfg. Co.....	30¢&10¢
Double Cut, Hartwell's, 1/2 gro.....	\$5.25
Double Cut, Douglass.....	40¢&10¢
Double Cut, Ives.....	60¢&60¢

Bit Stock Drills—

Morse Twist Drills.....	50¢&10¢
Standard.....	50¢&10¢
Cleveland.....	50¢&10¢
Syracuse, for metal.....	50¢&10¢
Syracuse, for wood (wood list).....	30¢&30¢
Williams' or Holt's, for metal.....	50¢&10¢
Williams' or Holt's, for wood.....	40¢&10¢
Cincinnati, for wood.....	30¢&5¢
Cincinnati, for metal.....	40¢&10¢

Ship Augers and Bits—

L'Hommiedieu's.....	15¢&10¢
Watrous.....	15¢&10¢
Snell's.....	15¢&10¢
Snell's Ship Auger Pat'n Car Bits.....	15¢&10¢

Awl Hafts—

Sewing, Brass Fer. 1/2 gr. \$3.50.....	45¢&10¢
Pat. Sewing, Long.....	¢ doz \$1.20
Pat. Peg, Plain Top.....	45¢&10¢
Pat. Peg, Leather Top.....	¢ doz \$1.20

Awls, Brad Sets, &c—

Awls, Sewing, Common.....	¢ gr \$1.70, 35¢
Awls, Should. Peg.....	¢ gr \$2.45, 40¢&40¢
Awls, Pat. Peg.....	¢ gr \$3.75, 40¢&40¢
Awls, Shouldered Brad.....	¢ doz \$1.20
Awls, Handled Brad.....	¢ doz \$1.50
Awls, Handled Scratch.....	¢ doz \$1.50
Awls, Socket Scratch.....	¢ doz \$1.50

Awl and Tool Sets—

Aiken's Sets, Awls and Tools.....	
No. 20, 1/2 doz \$10.00.....	55¢&10¢
Fraser's Adj. Tool Hds., Nos. 1, 1/2; 2, 1/2; 3, 1/2; 4, 1/2.....	25¢&25¢
Miller's Falls Adj. Tool Hds.....	25¢
No. 1, 1/2, 2, 1/2.....	25¢
Henry's Combination Haft.....	¢ doz \$6.50
No. 43, \$10.50; No. 43, \$12.50.....	70¢&10¢
Stanley's Excelsior.....	
No. 1, \$7.50; No. 2, \$4.00; No. 3, \$5.50.....	30¢&10¢

Axes—

Makers' and Special Brands—	
First quality.....	¢ doz \$6.00 @ \$6.50
Others.....	¢ doz \$5.50 @ \$5.75
Axle Grease—	
Fraser's.....	¢ doz \$4.75, 4¢, 5¢
Fraser's, in boxes.....	¢ doz \$9.50
Dixon's Everlasting, in box.....	\$1.20 2 1/2 \$2.00
Dixon's Everlasting.....	10¢ pails, ea. 85¢
Lower grades, special brands.....	¢ gr \$5.50 @ \$7.00

Axles—

No. 1, 1/4 @ \$5.00, No. 2 5/8 @ \$6.00.....	
Nos. 7 to 14.....	55¢&5¢
Nos. 15 to 18.....	47¢
Nos. 19 to 22.....	70¢
National Tubular Self-Oiling Standard Farm (1 to 5) and Special Farm (A1 to A5).....	
Less than 10 sets.....	33¢
Over 10 sets.....	33¢&5¢

Bag Holders—

Spangle's Pat.....	¢ doz \$18.....
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Balances—

Spring Balances.....	50¢
Common 24-in.....	¢ doz \$1.50.....
Chatillon's Spring Balances.....	50¢
Chatillon's Circular Spring Balances.....	60¢

Basins, Wash—

Standard Fiberware, No. 1, 10 1/2-inch, 8; 12-inch, \$2.25; 13 1/2-inch, \$2.75; 15-inch, \$3.25.....	
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Beaters—

Keystone, P.D. & C., Each, No. 1, 1; No. 2, 2.....	25¢
See also Egg Beaters.....	

Bells—

Hand—	
Light Brass.....	70¢&10¢
Extra Heavy.....	60¢&10¢
White Metal.....	60¢&10¢
Silver Chime.....	33¢&10¢
Globe (Cone's Patent).....	25¢&10¢

Door—

Gong, Abbe's.....	33¢&10¢
Gong, Yankee.....	45¢&10¢
Gong, Barton's.....	40¢&10¢
Gong, Taylor's.....	25¢&10¢
Crank, Taylor's.....	50¢&10¢
Crank Cone's.....	10¢

Crank, Connel's.....	20¢&10¢
Lever, Sargent's.....	60¢&10¢
Lever, Taylor's Bronzed or Plated.....	25¢&10¢
Lever, Taylor's Japanned.....	25¢&10¢
Lever, R. E. M. Co.'s.....	50¢&10¢
Pull, Brook's.....	50¢&10¢
Pull, Western.....	25¢&10¢

Cow—

Common Wrought.....	60¢&10¢
Western.....	20¢&10¢
Western, Sargent's list.....	70¢&10¢
Kentucky, "Star".....	20¢&10¢
Kentucky, Sargent's list.....	70¢&10¢
Dodge, Genuine Kentucky.....	70¢&10¢
Texas Star.....	50¢&10¢
Call.....	40¢&40¢
Farm Bells.....	¢ doz \$3.40
Steel Alloy Church and School Bells.....	40¢

Bellows—

Blacksmiths'.....	60¢&60¢
Molders'.....	40¢&40¢
Hand Bellows.....	40¢&10¢

Belted, Rubber—

Common Standard.....	70¢&10¢
Standard.....	70¢&70¢
Extra.....	60¢&5¢
N. Y. B. & P. Co., Carbon.....	60¢&10¢
N. Y. B. & P. Co., Diamond.....	50¢&10¢

Bench Stops—

Mortill's.....	¢ doz \$9, 50¢
Hotchkiss's.....	¢ doz \$5, 10¢&10¢
West n's, No. 1, 1/2; No. 2, 1/2.....	\$9.25 & 10¢&5¢
McGill's.....	¢ doz \$3.....
Cincinnati.....	25¢&10¢

Bits—

Auger, Gimlet, Bit Stock, Drills, &c., see Augers and Bits.....	
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Bit Holders—

Extension.....	
Barber's.....	¢ doz \$15.00.....
Ives, 1/2 doz \$20.00.....	60¢&5¢
Diagonal.....	¢ doz \$24.00, 40¢
Angular.....	¢ doz \$24.00, 40¢&5¢

Blind Adjusters—

Domestic.....	¢ doz \$3.00, 33¢
Excelsior.....	¢ doz \$10.00.....
Washburn's Self-Locking.....	20¢&20¢

Blind Fasteners—

Mackrell's.....	¢ doz \$1.00.....
Van Sand's Screw Pat., \$15 1/2 gr.....	60¢&10¢
Van Sand's Old Pat., \$15.00 gr.....	55¢&10¢
Washburn's Old Pattern, 1/2 gr.....	\$9.00
Merriman's.....	new list
Austin & Eddy No. 2008, 1/2 gr.....	\$9.00
Security Gravity, 1/2 gr.....	\$9.00

Blind Staples—

Barbed, 1/4 in. and larger.....	¢ doz 7 1/2 @ 8¢
Barbed, 1/2 in. and larger.....	¢ doz 8 1/2 @ 9¢

Blocks—

Ordinary Tackle, list May 20, 1889.....	50¢
Cleveland Block Co., Mal. Iron.....	50¢
Moore's Novelty, Mal. Iron.....	50¢

Boils—

Door and Shutter—	
Cast Iron Barrel, Square, &c.....	70¢&70¢
Cast Iron Shutter Bolts.....	70¢&70¢
Cast Iron Chain (Sargent's list).....	65¢&10¢
Ives' Patent Door Bolts.....	60¢
Wrought Barrel.....	70¢&70¢
Wrought Square.....	70¢&70¢
Wrt Shutter, all Iron, Stanley's.....	60¢&10¢
Wrt Shutter, Brass Knob.....	40¢&10¢
Wrt Shutter, Sargent's list.....	60¢&10¢
Wrt Sunk Flush, Sargent's list.....	55¢&10¢
Wrt Sunk Flush, Stanley's list.....	50¢&10¢
Wrt B.K. Flush, Com'n.....	55¢&10¢

Carriage, Machine, &c—

Com. list June 10, '84.....	70¢&12¢
Genuine Eagle, list Oct. '84.....	75¢&10¢
Phila. pattern, list Oct. '84.....	80¢&80¢
R.B. & W., old list.....	70¢
Machine, list Jan. 1, 1890.....	75¢&10¢
Bolt Ends, list Jan. 1, 1890.....	75¢&10¢

Tire—

Common, list Feb. 28, '83.....	67¢
Port Chester Bolt and Nut Company.....	67¢
Empire, list Feb. 28, '83.....	67¢
Keystone, Philadel., list Oct. '84.....	80¢
Norway, Phila., list Oct. '84.....	75¢
American Screw Company.....	
Norway, Phila., list Oct. 16, '84.....	75¢
Eagle, Phila., list Oct. 16, '84.....	80¢
Philadel., list Oct. 16, '84.....	80¢
Bay State, list Feb. 28, '83.....	67¢
R.B. & W., Philadel., list Oct. 16, '84.....	80¢

Stove and Plow—

Stove.	62 1/2%
Plow.	60 1/2%
R. B. & W. Plow	55%

Cross-Cut Saw Handles—
Atkins No. 1 Loop, # pair, 28¢; No. 3, 18¢; No. 6, 16¢; No. 2 and No. 4 Reversible, 15¢.
Boynston's Loop Saw Handles, 50¢; No. 1 Champion, 15¢.

Hangers—
Barn Door, old patterns, 60¢; 10¢; 10¢; 70¢
Barn Door, New England, 60¢; 10¢; 10¢; 70¢
Samson Steel Anti-Friction, 50¢
Orleans Steel, 50¢
Hamilton Wrought Wood Track, 55¢
U. S. Wood Track, 65¢
Champion, 60¢; 10¢
Rider and Wooster, Medina Yfg. Co.'s list, 70¢
Climax Anti-Friction, 60¢
Climax Anti-Friction for Wood Track, 55¢
Zenith for Wood Track, 55¢
Reed's Steel Arm, 50¢
Challenge, Barn Door, 50¢
Sterling's Imp'vd (Anti-Friction), 65¢; 10¢
Victor, No. 1, \$15.00; No. 2, \$15.50; No. 3, \$18.00; No. 4, \$20.00; No. 5, \$22.00; No. 6, \$24.00; No. 7, \$26.00; No. 8, \$28.00; No. 9, \$30.00; No. 10, \$32.00; No. 11, \$34.00; No. 12, \$36.00; No. 13, \$38.00; No. 14, \$40.00; No. 15, \$42.00; No. 16, \$44.00; No. 17, \$46.00; No. 18, \$48.00; No. 19, \$50.00; No. 20, \$52.00; No. 21, \$54.00; No. 22, \$56.00; No. 23, \$58.00; No. 24, \$60.00; No. 25, \$62.00; No. 26, \$64.00; No. 27, \$66.00; No. 28, \$68.00; No. 29, \$70.00; No. 30, \$72.00; No. 31, \$74.00; No. 32, \$76.00; No. 33, \$78.00; No. 34, \$80.00; No. 35, \$82.00; No. 36, \$84.00; No. 37, \$86.00; No. 38, \$88.00; No. 39, \$90.00; No. 40, \$92.00; No. 41, \$94.00; No. 42, \$96.00; No. 43, \$98.00; No. 44, \$100.00; No. 45, \$102.00; No. 46, \$104.00; No. 47, \$106.00; No. 48, \$108.00; No. 49, \$110.00; No. 50, \$112.00; No. 51, \$114.00; No. 52, \$116.00; No. 53, \$118.00; No. 54, \$120.00; No. 55, \$122.00; No. 56, \$124.00; No. 57, \$126.00; No. 58, \$128.00; No. 59, \$130.00; No. 60, \$132.00; No. 61, \$134.00; No. 62, \$136.00; No. 63, \$138.00; No. 64, \$140.00; No. 65, \$142.00; No. 66, \$144.00; No. 67, \$146.00; No. 68, \$148.00; No. 69, \$150.00; No. 70, \$152.00; No. 71, \$154.00; No. 72, \$156.00; No. 73, \$158.00; No. 74, \$160.00; No. 75, \$162.00; No. 76, \$164.00; No. 77, \$166.00; No. 78, \$168.00; No. 79, \$170.00; No. 80, \$172.00; No. 81, \$174.00; No. 82, \$176.00; No. 83, \$178.00; No. 84, \$180.00; No. 85, \$182.00; No. 86, \$184.00; No. 87, \$186.00; No. 88, \$188.00; No. 89, \$190.00; No. 90, \$192.00; No. 91, \$194.00; No. 92, \$196.00; No. 93, \$198.00; No. 94, \$200.00; No. 95, \$202.00; No. 96, \$204.00; No. 97, \$206.00; No. 98, \$208.00; No. 99, \$210.00; No. 100, \$212.00; No. 101, \$214.00; No. 102, \$216.00; No. 103, \$218.00; No. 104, \$220.00; No. 105, \$222.00; No. 106, \$224.00; No. 107, \$226.00; No. 108, \$228.00; No. 109, \$230.00; No. 110, \$232.00; No. 111, \$234.00; No. 112, \$236.00; No. 113, \$238.00; No. 114, \$240.00; No. 115, \$242.00; No. 116, \$244.00; No. 117, \$246.00; No. 118, \$248.00; No. 119, \$250.00; No. 120, \$252.00; No. 121, \$254.00; No. 122, \$256.00; No. 123, \$258.00; No. 124, \$260.00; No. 125, \$262.00; No. 126, \$264.00; No. 127, \$266.00; No. 128, \$268.00; No. 129, \$270.00; No. 130, \$272.00; No. 131, \$274.00; No. 132, \$276.00; No. 133, \$278.00; No. 134, \$280.00; No. 135, \$282.00; No. 136, \$284.00; No. 137, \$286.00; No. 138, \$288.00; No. 139, \$290.00; No. 140, \$292.00; No. 141, \$294.00; No. 142, \$296.00; No. 143, \$298.00; No. 144, \$300.00; No. 145, \$302.00; No. 146, \$304.00; No. 147, \$306.00; No. 148, \$308.00; No. 149, \$310.00; No. 150, \$312.00; No. 151, \$314.00; No. 152, \$316.00; No. 153, \$318.00; No. 154, \$320.00; No. 155, \$322.00; No. 156, \$324.00; No. 157, \$326.00; No. 158, \$328.00; No. 159, \$330.00; No. 160, \$332.00; No. 161, \$334.00; No. 162, \$336.00; No. 163, \$338.00; No. 164, \$340.00; No. 165, \$342.00; No. 166, \$344.00; No. 167, \$346.00; No. 168, \$348.00; No. 169, \$350.00; No. 170, \$352.00; No. 171, \$354.00; No. 172, \$356.00; No. 173, \$358.00; No. 174, \$360.00; No. 175, \$362.00; No. 176, \$364.00; No. 177, \$366.00; No. 178, \$368.00; No. 179, \$370.00; No. 180, \$372.00; No. 181, \$374.00; No. 182, \$376.00; No. 183, \$378.00; No. 184, \$380.00; No. 185, \$382.00; No. 186, \$384.00; No. 187, \$386.00; No. 188, \$388.00; No. 189, \$390.00; No. 190, \$392.00; No. 191, \$394.00; No. 192, \$396.00; No. 193, \$398.00; No. 194, \$400.00; No. 195, \$402.00; No. 196, \$404.00; No. 197, \$406.00; No. 198, \$408.00; No. 199, \$410.00; No. 200, \$412.00; No. 201, \$414.00; No. 202, \$416.00; No. 203, \$418.00; No. 204, \$420.00; No. 205, \$422.00; No. 206, \$424.00; No. 207, \$426.00; No. 208, \$428.00; No. 209, \$430.00; No. 210, \$432.00; No. 211, \$434.00; No. 212, \$436.00; No. 213, \$438.00; No. 214, \$440.00; No. 215, \$442.00; No. 216, \$444.00; No. 217, \$446.00; No. 218, \$448.00; No. 219, \$450.00; No. 220, \$452.00; No. 221, \$454.00; No. 222, \$456.00; No. 223, \$458.00; No. 224, \$460.00; No. 225, \$462.00; No. 226, \$464.00; No. 227, \$466.00; No. 228, \$468.00; No. 229, \$470.00; No. 230, \$472.00; No. 231, \$474.00; No. 232, \$476.00; No. 233, \$478.00; No. 234, \$480.00; No. 235, \$482.00; No. 236, \$484.00; No. 237, \$486.00; No. 238, \$488.00; No. 239, \$490.00; No. 240, \$492.00; No. 241, \$494.00; No. 242, \$496.00; No. 243, \$498.00; No. 244, \$500.00; No. 245, \$502.00; No. 246, \$504.00; No. 247, \$506.00; No. 248, \$508.00; No. 249, \$510.00; No. 250, \$512.00; No. 251, \$514.00; No. 252, \$516.00; No. 253, \$518.00; No. 254, \$520.00; No. 255, \$522.00; No. 256, \$524.00; No. 257, \$526.00; No. 258, \$528.00; No. 259, \$530.00; No. 260, \$532.00; No. 261, \$534.00; No. 262, \$536.00; No. 263, \$538.00; No. 264, \$540.00; No. 265, \$542.00; No. 266, \$544.00; No. 267, \$546.00; No. 268, \$548.00; No. 269, \$550.00; No. 270, \$552.00; No. 271, \$554.00; No. 272, \$556.00; No. 273, \$558.00; No. 274, \$560.00; No. 275, \$562.00; No. 276, \$564.00; No. 277, \$566.00; No. 278, \$568.00; No. 279, \$570.00; No. 280, \$572.00; No. 281, \$574.00; No. 282, \$576.00; No. 283, \$578.00; No. 284, \$580.00; No. 285, \$582.00; No. 286, \$584.00; No. 287, \$586.00; No. 288, \$588.00; No. 289, \$590.00; No. 290, \$592.00; No. 291, \$594.00; No. 292, \$596.00; No. 293, \$598.00; No. 294, \$600.00; No. 295, \$602.00; No. 296, \$604.00; No. 297, \$606.00; No. 298, \$608.00; No. 299, \$610.00; No. 300, \$612.00; No. 301, \$614.00; No. 302, \$616.00; No. 303, \$618.00; No. 304, \$620.00; No. 305, \$622.00; No. 306, \$624.00; No. 307, \$626.00; No. 308, \$628.00; No. 309, \$630.00; No. 310, \$632.00; No. 311, \$634.00; No. 312, \$636.00; No. 313, \$638.00; No. 314, \$640.00; No. 315, \$642.00; No. 316, \$644.00; No. 317, \$646.00; No. 318, \$648.00; No. 319, \$650.00; No. 320, \$652.00; No. 321, \$654.00; No. 322, \$656.00; No. 323, \$658.00; No. 324, \$660.00; No. 325, \$662.00; 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No. 485, \$982.00; No. 486, \$984.00; No. 487, \$986.00; No. 488, \$988.00; No. 489, \$990.00; No. 490, \$992.00; No. 491, \$994.00; No. 492, \$996.00; No. 493, \$998.00; No. 494, \$1000.00; No. 495, \$1002.00; No. 496, \$1004.00; No. 497, \$1006.00; No. 498, \$1008.00; No. 499, \$1010.00; No. 500, \$1012.00; No. 501, \$1014.00; No. 502, \$1016.00; No. 503, \$1018.00; No. 504, \$1020.00; No. 505, \$1022.00; No. 506, \$1024.00; No. 507, \$1026.00; No. 508, \$1028.00; No. 509, \$1030.00; No. 510, \$1032.00; No. 511, \$1034.00; No. 512, \$1036.00; No. 513, \$1038.00; No. 514, \$1040.00; No. 515, \$1042.00; No. 516, \$1044.00; No. 517, \$1046.00; No. 518, \$1048.00; No. 519, \$1050.00; No. 520, \$1052.00; No. 521, \$1054.00; No. 522, \$1056.00; No. 523, \$1058.00; No. 524, \$1060.00; No. 525, \$1062.00; No. 526, \$1064.00; No. 527, \$1066.00; No. 528, \$1068.00; No. 529, \$1070.00; No. 530, \$1072.00; No. 531, \$1074.00; No. 532, \$1076.00; No. 533, \$1078.00; No. 534, \$1080.00; No. 535, \$1082.00; No. 536, \$1084.00; No. 537, \$1086.00; No. 538, \$1088.00; No. 539, \$1090.00; No. 540, \$1092.00; No. 541, \$1094.00; No. 542, \$1096.00; No. 543, \$1098.00; No. 544, \$1100.00; No. 545, \$1102.00; No. 546, \$1104.00; No. 547, \$1106.00; No. 548, \$1108.00; No. 549, \$1110.00; No. 550, \$1112.00; No. 551, \$1114.00; No. 552, \$1116.00; No. 553, \$1118.00; No. 554, \$1120.00; No. 555, \$1122.00; No. 556, \$1124.00; No. 557, \$1126.00; No. 558, \$1128.00; No. 559, \$1130.00; No. 560, \$1132.00; No. 561, \$1134.00; No. 562, \$1136.00; No. 563, \$1138.00; No. 564, \$1140.00; No. 565, \$1142.00; No. 566, \$1144.00; No. 567, \$1146.00; No. 568, \$1148.00; No. 569, \$1150.00; No. 570, \$1152.00; No. 571, \$1154.00; No. 572, \$1156.00; No. 573, \$1158.00; No. 574, \$1160.00; No. 575, \$1162.00; No. 576, \$1164.00; No. 577, \$1166.00; No. 578, \$1168.00; No. 579, \$1170.00; No. 580, \$1172.00; No. 581, \$1174.00; No. 582, \$1176.00; No. 583, \$1178.00; No. 584, \$1180.00; No. 585, \$1182.00; No. 586, \$1184.00; No. 587, \$1186.00; No. 588, \$1188.00; No. 589, \$1190.00; No. 590, \$1192.00; No. 591, \$1194.00; No. 592, \$1196.00; No. 593, \$1198.00; No. 594, \$1200.00; No. 595, \$1202.00; No. 596, \$1204.00; No. 597, \$1206.00; No. 598, \$1208.00; No. 599, \$1210.00; No. 600, \$1212.00; No. 601, \$1214.00; No. 602, \$1216.00; No. 603, \$1218.00; No. 604, \$1220.00; No. 605, \$1222.00; No. 606, \$1224.00; No. 607, \$1226.00; No. 608, \$1228.00; No. 609, \$1230.00; No. 610, \$1232.00; No. 611, \$1234.00; No. 612, \$1236.00; No. 613, \$1238.00; No. 614, \$1240.00; No. 615, \$1242.00; No. 616, \$1244.00; No. 617, \$1246.00; No. 618, \$1248.00; No. 619, \$1250.00; No. 620, \$1252.00; No. 621, \$1254.00; No. 622, \$1256.00; No. 623, \$1258.00; No. 624, \$1260.00; No. 625, \$1262.00; No. 626, \$1264.00; No. 627, \$1266.00; No. 628, \$1268.00; No. 629, \$1270.00; No. 630, \$1272.00; No. 631, \$1274.00; No. 632, \$1276.00; No. 633, \$1278.00; No. 634, \$1280.00; No. 635, \$1282.00; No. 636, \$1284.00; No. 637, \$1286.00; No. 638, \$1288.00; No. 639, \$1290.00; No. 640, \$1292.00; No. 641, \$1294.00; No. 642, \$1296.00; No. 643, \$1298.00; No. 644, \$1300.00; No. 645, \$1302.00; No. 646, \$1304.00; No. 647, \$1306.00; No. 648, \$1308.00; No. 649, \$1310.00; No. 650, \$1312.00; No. 651, \$1314.00; No. 652, \$1316.00; No. 653, \$1318.00; No. 654, \$1320.00; No. 655, \$1322.00; No. 656, \$1324.00; No. 657, \$1326.00; No. 658, \$1328.00; No. 659, \$1330.00; No. 660, \$1332.00; No. 661, \$1334.00; No. 662, \$1336.00; No. 663, \$1338.00; No. 664, \$1340.00; No. 665, \$1342.00; No. 666, \$1344.00; No. 667, \$1346.00; No. 668, \$1348.00; No. 669, \$1350.00; No. 670, \$1352.00; No. 671, \$1354.00; No. 672, \$1356.00; No. 673, \$1358.00; No. 674, \$1360.00; No. 675, \$1362.00; No. 676, \$1364.00; No. 677, \$1366.00; No. 678, \$1368.00; No. 679, \$1370.00; No. 680, \$1372.00; No. 681, \$1374.00; No. 682, \$1376.00; No. 683, \$1378.00; No. 684, \$1380.00; No. 685, \$1382.00; No. 686, \$1384.00; No. 687, \$1386.00; No. 688, \$1388.00; No. 689, \$1390.00; No. 690, \$1392.00; No. 691, \$1394.00; No. 692, \$1396.00; No. 693, \$1398.00; No. 694, \$1400.00; No. 695, \$1402.00; No. 696, \$1404.00; No. 697, \$1406.00; No. 698, \$1408.00; No. 699, \$1410.00; No. 700, \$1412.00; No. 701, \$1414.00; No. 702, \$1416.00; No. 703, \$1418.00; No. 704, \$1420.00; No. 705, \$1422.00; No. 706, \$1424.00; No. 707, \$1426.00; No. 708, \$1428.00; No. 709, \$1430.00; No. 710, \$1432.00; No. 711, \$1434.00; No. 712, \$1436.00; No. 713, \$1438.00; No. 714, \$1440.00; No. 715, \$1442.00; No. 716, \$1444.00; No. 717, \$1446.00; No. 718, \$1448.00; No. 719, \$1450.00; No. 720, \$1452.00; No. 721, \$1454.00; No. 722, \$1456.00; No. 723, \$1458.00; No. 724, \$1460.00; No. 725, \$1462.00; No. 726, \$1464.00; No. 727, \$1466.00; No. 728, \$1468.00; No. 729, \$1470.00; No. 730, \$1472.00; No. 731, \$1474.00; No. 732, \$1476.00; No. 733, \$1478.00; No. 734, \$1480.00; No. 735, \$1482.00; No. 736, \$1484.00; No. 737, \$1486.00; No. 738, \$1488.00; No. 739, \$1490.00; No. 740, \$1492.00; No. 741, \$1494.00; No. 742, \$1496.00; No. 743, \$1498.00; No. 744, \$1500.00; No. 745, \$1502.00; No. 746, \$1504.00; No. 747, \$1506.00; No. 748, \$1508.00; No. 749, \$1510.00; No. 750, \$1512.00; No. 751, \$1514.00; No. 752, \$1516.00; No. 753, \$1518.00; No. 754, \$1520.00; No. 755, \$1522.00; No. 756, \$1524.00; No. 757, \$1526.00; No. 758, \$1528.00; No. 759, \$1530.00; No. 760, \$1532.00; No. 761, \$1534.00; No. 762, \$1536.00; No. 763, \$1538.00; No. 764, \$1540.00; No. 765, \$1542.00; No. 766, \$1544.00; No. 767, \$1546.00; No. 768, \$1548.00; No. 769, \$1550.00; No. 770, \$1552.00; No. 771, \$1554.00; No. 772, \$1556.00; No. 773, \$1558.00; No. 774, \$1560.00; No. 775, \$1562.00; No. 776, \$1564.00; No. 777, \$1566.00; No. 778, \$1568.00; No. 779, \$1570.00; No. 780, \$1572.00; No. 781, \$1574.00; No. 782, \$1576.00; No. 783, \$1578

Melasses Gates—

Stebbin's Pattern.....	75¢@75¢10¢
Stebbin's Genuine.....	60¢@10¢10¢
Stebbin's Tinned Ends.....	40¢@10¢
Chase's Hard Metal.....	50¢@10¢
Bush's.....	30¢
Lincoln's Pattern.....	70¢@70¢10¢
Wood's.....	20¢@10¢

Boas, # doz:
Nos. 1, 7; No. 2, 8; No. 3, 9; No. 1, 10.
\$10.....00¢@10¢10¢

Money Drawers..... # doz, \$18¢@20¢

Muzzles—

Safety..... # doz, \$3.00, 25¢

Nails, see Trade Report.

Wire Nails, Papered.
Association list, July 15, 1889.....70¢5¢
Tack Mfrs' list.....60¢@10¢10¢
Wire Nails, Standard Penny.
Card June 1, '89, base.....\$3.00 @ \$3.10

Nail Puller—

Curtiss Hammer..... # doz \$9.00
Giant, No. 1.....# doz, \$18.00, 10¢
Giant, No. 2.....# doz, \$15.00, 10¢
Pelican.....# doz, \$9.00, 25¢

Nail Sets—

Square..... # gr., \$4.00@4.25
Round.....# gr., \$3.25
Buck Bros.....27½¢
Cannon's Diamond Point.....# gr., \$12, 20¢

Nut Crackers—

Table (H. & R. Mfg. Co.)..... 40¢
Blake's Pattern.....# doz, \$2.00, 10¢
Turner & Seymour Mfg. Co.....50¢

Nuts—

Nuts, off list Dec. 18, 1889: Square, Hex.
Hot Pressed.....5¢ 5½¢
Cold Punched.....5¢ 5½¢
In lots less than 100 lb, # D, add ¼¢; 1-b
boxes, add 1¢ to list.

Oakum—

Government..... # D 7½¢@7½¢
U. S. Navy.....# D 6½¢@6½¢
Navy.....# D 5½¢@5½¢

Oilers—

Zinc and Tin..... 65¢@65¢10¢
Brass and Copper.....50¢@50¢10¢5¢
Malleable, Hammers, Improved, No. 1,
\$3.00; No. 2, \$4.00; No. 3, \$4.40 # doz.
10¢@10¢5¢
Malleable, Hammers, Old Pattern, same
list.....40¢
Prior's Pat. or "Paragon" Zinc.....10¢@10¢10¢

Prior's Pat. or "Paragon" Brass..... 50¢
Olmstead's Tin and Zinc.....50¢
Olmstead's Brass and Copper.....50¢
Broughton's Zinc.....50¢
Broughton's Brass.....50¢
Gem P. D. & Co.....# gro, \$2

Packing, Steam—

Rubber—
Standard.....60¢@10¢60¢10¢10¢
Extra.....50¢@10¢60¢
N. Y. B. & P. Co., Standard.....50¢@10¢60¢
N. Y. B. & P. Co., Empire.....70¢
N. Y. B. & P. Co., Salamander.....# D 65¢, 30¢

Jenkins' Standard..... # D 65¢, 30¢

Miscellaneous—

American Packing..... 10¢@11¢ # D
Russia Packing.....14¢ # D
Italian Packing.....13¢@14¢ # D
Cotton Packing.....15¢@17¢ # D
Jute.....7¢@8¢ # D

Padlocks—

See Locks.

Pails—

Galvanized Iron—See Trade Report
Quarts.....10 12 14
Hill's Light Weight, # doz, \$2.75 3.00 3.25
Hill's Heavy Weight, # doz, 3.00 3.25 3.75
Whiting's.....2.75 3.00 3.25
Sidney Shephard & Co.....2.04 3.15 3.25
Iron Clad.....2.50 2.75 3.00
Fire Buckets.....2.75 3.25 3.50
Buckets, see Weld Buckets.

Indurated Fibre Ware—25¢
Star Pails, 12 qt.....# doz \$6.00
Fire, Stable and Milk, 14 qt.....# doz \$7.80

Standard Fibre Ware—
Plain, Dec'd
Water Pails, 12 qt., per doz, \$4.00 \$4.50
Dairy Pails, 14 qt., per doz, 4.50 5.00
Fire Pails, No. 1, 12 qt., per doz, 4.50 5.00
Fire Pails, No. 2, 14 qt., per doz, 5.00 5.50
Sugar Pails.....6.00 6.50
Horse Pails.....5.00
Buggy Pails.....4.00 9.00
Slop Jars (bal. trap).....8.00 9.00
Chamber Pails, 14 qt.....6.50 7.50

Pencils—
Faber's Carpenters'.....high list 50¢
Faber's Round Gilt.....# gro \$5.25
Dixon's Lead.....# gro \$4.50
Dixon's Lumber.....# gro \$6.75
Dixon's Carpenters'.....40¢@10¢

Picks—
Railroad or Adze Eye, 5 to 6, \$12.00;
6 to 7, \$13.00.....60¢ @ 60¢5¢

Picture Nails—

Brass Head, Sargent's list..... 50¢@10¢10¢
Brass Head, Combination list.....50¢@10¢
Porcelain Head, Sargent's list.....50¢@10¢10¢
Porcelain Head, Combination list.....40¢@10¢
Niles' Patent.....40¢

Pinking Irons— # doz 65¢ net

Pipe, Wrought Iron—
List September 18, 1889,
1¼ and under, Plain.....47½¢
1¼ and under, Galvanized.....47½¢
1½ and over, Plain.....6¢
1½ and over, Galvanized.....47½¢
Boiler Tubes, Iron.
1¼ and under.....45¢
2 to 4 inch.....50¢
4-inch and larger.....52½¢

Planes and Plane Irons—
Wood Planes—
Molding.....45¢2¢
Bench, First Quality.....55¢2¢
Bench, Second Quality.....90¢2¢
Bailey's (Stanley R. & L. Co.).....40¢@10¢

Iron Planes—
Bailey's (Stanley R. & L. Co.).....40¢@10¢
Miscellaneous Planes (Stanley R. & L. Co.).....20¢@10¢
Victor Planes (Stanley R. & L. Co.).....20¢@10¢
Steer's Iron Planes.....35¢@55¢
Meeten Mail Iron Co.'s.....30¢@10¢50¢10¢10¢
via Iron Planes.....30¢@10¢30¢10¢10¢

Birmingham Plane Co..... 50¢@50¢5¢
Gage Tool Co.'s Self-Setting.....20¢@10¢
Chaplin's Iron Planes.....40¢@10¢5¢
Sargent's.....30¢@10¢30¢10¢10¢

Plane Irons—
Butcher's.....\$5.00@5.25 to 5¢
Buck Bros.....20¢
Auburn "Thistle.....35¢2¢
Ohio.....35¢2¢
Sandusky.....25¢
L. & J. White.....25¢

Pliers and Nippers—
Button's Patent.....30¢@10¢40¢
Hall's No. 2, 5 in., \$13.50; No. 4, 7 in.
\$21.00 # doz.....20¢@10¢33¢4¢
Humason & Beckley Mfg. Co.....50¢@10¢10¢
Gas Pliers.....50¢
Gas Pliers, Custard's Nickel Plated.....40¢
Eureka Pliers and Nippers.....40¢
Russell's Parallel.....25¢
P. S. & W. Cast Steel.....50¢
P. S. & W. Tinner's Cutting Nippers,
add 6¢ dis 10¢
Carew's Pat. Wire Cutters.....20¢
Morrill's Parallel, # doz, \$12.00.....30¢5¢
Cronk's 8 in., \$15.00; 10 in., \$21.00,
40¢@40¢5¢

Plumbs and Levels—
Regular List.....70¢@10¢70¢10¢10¢
Disston's.....45¢10¢
Pocket Levels.....70¢@10¢70¢10¢10¢
Davis Iron Levels.....30¢
Davis' Inclometers.....10¢@10¢

Polish, Metal.
Prestoline.....20¢@10¢
Prestoline Paste.....33¢4¢
Gaston's Silver Compound.....33¢4¢

Pokes, Animal—
Bishop's L. X. L.....# doz \$6.00
Bishop's O. K.....# doz \$5.25
Bishop's Pioneer.....# doz \$3.75
Bishop's American.....# doz \$2.75

Poppers, Corn—
Round or Square, 1 qt.....# gr \$10.00@10.50
Round or Square, 1½ qt.....# gr \$15.00@15.50
Round or Square, 2 qt.....# gr \$18.50@19.00

Post Hole and Tree Augers and Diggers—
Samson Post Hole Digger, # doz \$36.00,
25¢10¢
Fletcher Post Hole Augers, # doz \$30, 20¢
Eureka Diggers.....# doz \$16.00@17.00
Leed's.....# doz \$8.00@9.00
Vaughan's Post Hole Auger, # doz
\$13.00@14.00
Kohler's Little Giant.....# doz \$18.00
Kohler's Hercules.....# doz \$15.00
Kohler's New Champion.....# doz \$9.00
Schneider.....# doz \$18.00
Ryan's Post Hole Diggers, # doz \$34.00
Cronk's Post Bars, # doz \$60.00,
50¢5¢50¢10¢
Gibbs Post Hole Digger, # doz \$30.00, 50¢
Imperial, # doz, \$15.....40¢

Potato Parers—
White Mountain.....# doz \$5.00@5.50
Antrim Combination.....# doz \$8.00
Rooster.....# doz \$13.50

Pruning Hooks and Shears—
Disston's Combined Pruning Hook and
Saw.....# doz \$18.00, 20¢10¢
Disston's Pruning Hook, # doz \$12.00,
20¢10¢
E. S. Lee & Co.'s Pruning Tools.....40¢
Pruning Shears, Henry's Pat, # doz
\$3.75@4.00 net
Henry's Pruning Shears, # doz \$4.25@
4.50 net
Wheeler, M. & C. Co.'s Combination,
doz \$12.00, 20¢
Dunlap's Saw and Chisel, # doz \$8.50, 30¢
J. Mallinson & Co., No. 1, \$5.25; No. 2, 7.25
P. S. & W. Co.....60¢

Pullers—
Hot House, Awning, &c.....60¢10¢
Japanned Screw.....60¢10¢
Brass Screw.....60¢10¢
Japanned Side.....60¢10¢
Japanned Clothes Line.....60¢10¢
Empire Sash Pulley.....55¢@10¢
Moore's Sash, Anti-Friction.....50¢
Hay Fork, Solid Eye, \$4.00; Swivel,
\$4.50.....50¢@10¢50¢10¢5¢
Hay Fork, "Anti-Friction," 5 in. Solid,
\$5.70.....50¢
Hay Fork, "P" Common and Pat.
Bushed.....20¢
Hay Fork, Tarbox Pat. Iron.....20¢
Hay Fork, Reed's Self-Lubricating.....20¢
Shade Rack.....45¢
Tackle Blocks.....See Blocks
Moore's Anti-Friction 5 in. Wheel, # doz
\$12.00.....40¢

Pumps—
Clister, Best Makers.....60¢@60¢10¢
Pitcher Spout, Best Makers.....67½¢@70¢
Pitcher Spout, Cheaper Goods, 70¢@70¢5¢

Punches—
Saddlers' or Drive, good, # doz.....60¢@65¢
Bemis & Call Co.'s Cast Steel Drive, 50¢5¢
Bemis & Call Co.'s Spring Steel Drive, 50¢5¢
Spring, good quality.....# doz \$2.50@2.80
Spring, Leach's Pat.....15¢
Bemis & Call Co.'s Spring and Check.....40¢
Solid Tinner's, P. S. & W. Co., # doz \$1.44, 55¢
Tin's Hollow Punches P. S. & W. Co. 20¢2¢
Rice Hand Punches.....15¢
Avery's Revolving.....40¢
Avery's Saw-Set and Punch, See Saw Sets.

Rail—
Sliding Door, Wrt Brass, # D 35¢.....15¢
Sliding Door, Bronzed Wrt Iron, # ft, 7¢
Sliding Door, Iron, Painted, # foot 4¢, 40¢
Barn Door, Light, in. ¼ ¾ ¾
Per 100 feet.....\$2.00 2.50 3.10, 10¢
B. D. for N. E. Hangers.....Small, Med. Large,
\$2.15 2.70 3.25.
Terry's Steel Rail, # foot.....44¢
Victor Track Rail, 7¢ # foot.....50¢2¢
Carrier Steel Rail, # foot.....44¢
Moore's Wrought Iron.....25¢

Rakes—
Cast Steel, Association goods.....70¢
Cast Steel, outside goods.....60¢@10¢10¢70¢5¢
Malleable.....70¢@70¢5¢
Gibbs Lawn Rake.....\$12.00, 50¢15¢
Canton Lawn Rake.....\$6.00, 50¢10¢
Ft. Madison Prize Bow Rake and Feet,
less.....65¢

Fort Madison Steel Tooth Lawn Rake,
#6.00.....25¢

Razors—

J. R. Torrey Razor Co..... 20¢
Wostenholme and Butcher, \$10.00 to 1¢
10¢
Jordan's A A 1, list Nov. 1, 1889.....50¢
Jordan's Old Faithful, list Nov. 1, '89, 50¢
Electric.....List net

Razor Straps—

Genuine Emerson..... 60¢@60¢5¢
Imitation.....# doz \$2.00, 20¢10¢5¢
Torrey's.....20¢
Badger's Belt and Com.....# doz \$2.00
Lamont Combination.....# doz \$4.00
Jordan's Pat Padded, list Nov. 1, '89, 50¢
Electric.....List net

Rivets and Burrs—

Iron, list Nov. 17, '87..... 40¢
Copper.....50¢@50¢10¢

Rivet Sets—

Stair, Brass..... 25¢2¢
Stair, Black Walnut.....# doz 40¢

Rollers—

Barn Door, Sargent's list..... 60¢@10¢10¢
Acme Moore's Anti-Friction.....55¢
Union Barn Door Roller.....70¢

Rope—

Manufacturers' prices:
Manilla, ¼ in. and larger # D 15¢
Manilla, ¾ in. # D 15¢
Manilla, 1 in. and 5-16 in. # D 15¢4¢
Manila Tarral Rope.....# D 14¢
Manila, Hay Rope.....# D 13¢
Sisal, ¼ inch and larger # D 12¢
Sisal, ¾ in. # D 12½¢
Sisal, 1 in. and 5-16 in. # D 12½¢
Sisal, Hay Rope.....# D 12¢
Sisal, Tarral Rope.....# D 11½¢
Sisal, Medium Lathe Yarn, # D 11¢
Cotton Rope.....# D 15¢@18¢ net
Jute Rope.....# D 7½¢

Rules—

Boxwood..... 80¢@10¢80¢10¢10¢5¢
Ivory.....50¢@50¢10¢
Steel's Rules and Straight Edges.....25¢10¢

Sad Irons—

From 4 to 10, at factory..... # 100 lb
\$2.60@2.75
Self-Heating.....# doz \$9.00 net
Self-Heating, Tailors'.....# doz \$18.00 net
Gleason's Shield and Toilet.....25¢
Mrs. Pott's Irons.....40¢@40¢10¢
Enterprise Sad Irons.....40¢
Combined Fluter and Sad Iron, # doz,
\$15.00.....25¢
Fox Reversible, Self-Fluter # doz \$24.00,
Chinese Laundry (N.E. Butt Co.) 8½¢, 15¢
New England.....5¢, 15¢
Mahony's Troy Pol. Irons.....25¢
Sensib.....30¢@20¢5¢
National Self-Heating.....30¢

Sand and Emery Paper and Cloth—
List April 19, 1886.....50¢@50¢10¢
Sibley's Emery and Crocus Cloth.....30¢

Sash Cord—

Common..... # D, 10¢@11¢
Patent, good quality.....# D 13¢@13½¢
White Cotton Braided, fair.....# D 28¢@29¢
Common Russia Sash.....# D 13½¢
Patent.....# D 15¢
Cable Laid Italian Sash.....# D 22¢@23¢
India Cable Laid.....# D 13¢
Silver Lake.....
A Quality, White, 50¢.....10¢@10¢5¢
A Quality, Drab, 55¢.....10¢@10¢5¢
B Quality, White, 50¢.....20¢@10¢5¢
B Quality, Drab, 55¢.....20¢@10¢5¢
C Quality, White (only).....26¢@28¢
Sylvan Spring, Extra Braided, White, 34¢
Sylvan Spring, Extra Braided, Drab, 30¢
Semper Idem, Braided, White.....30¢
Egyptian, India Hemp, Braided.....25¢
Samson.....
Braided, White Cotton, 50¢.....30¢@30¢5¢
Braided, Drab Cotton, 55¢.....30¢@30¢5¢
Braided, Italian Hemp, 55¢.....30¢@30¢5¢
Braided, Linen, 80¢.....30¢@30¢5¢

Sash Locks—

Clark's, No. 1, \$10; No. 2, 8¢ # gr..... 33½¢
Fergus.....33½¢
Morris and Triumph, list Aug. 16, 1886,
60¢2¢
Victor.....60¢@10¢2¢
Walker's.....10¢
Attwell Mfg. Co.....25¢33½¢
Reading.....60¢@10¢60¢10¢10¢
Hammond's Window Springs.....40¢
Common Sense, Jap'd, Cop'd and
Br'zd.....# gr \$4.00
Common Sense, Nickel Plated
gr \$10.00.....30¢
Universal.....30¢
Kempshall's Gravity.....60¢
Kempshall's Model.....60¢@60¢10¢
Corbin's Daisy, list Feb. 15, 1886.....70¢
Payson's Perfect.....60¢@60¢10¢
Huginin's Sash Balances.....25¢5¢2¢
Huginin's New Sash Locks.....25¢5¢2¢
Stoddard's "Practical".....10¢
Ives' Patent.....60¢@60¢10¢
Liesche's, Nos. 100 and 110, # gr 25¢,
105, \$10.00.....20¢10¢
Davis, Bronze, Barnes Mfg. Co.....50¢
Champion Safety, list March 1, 1888,
55¢55¢5¢
Security.....70¢
Buckeye.....# gro \$4.80

Sash Weights—

Solid Eyes..... # ton \$22.00

Sausage Stuffers or Fillers—

Miles' "Challenge," # doz \$20, 50¢@50¢5¢
Perry.....# doz, No. 1, \$15.00; No. 2,
\$21.00.....50¢5¢50¢10¢
Draw cut No. 4, each \$30.00.....20¢
Enterprise Mfg. Co.....20¢@10¢30¢
Silver's.....40¢@10¢

Saws—

**Disston's Cir-
cular.....** 45¢@45¢5¢ Extras some-
times given
Disston's Cross
Cuts.....45¢@45¢5¢ by jobbers.
Disston's Hand 25¢5¢5¢
Atkins' Circular Abingale an Heading
60¢10¢

Atkins' Silver Steel Diamond X Cuts
foot 70¢

Atkins' Special Steel Dexter X Cuts
foot 50¢

Atkins' Special Steel Diamond X Cuts
foot 30¢

**Atkins' Champion and Electric Tooth
X Cuts.....** # foot 24¢25¢

Atkins' Hollow Back X Cuts..... # foot 15¢

Atkins' Mulay, Mill and Drag..... 40¢10¢

Atkins' One-Man Saw, with handles,
foot 32¢

W. M. & C. Hand..... 30¢5¢30¢10¢
W. M. & C. Champion X Cuts, Regu-
lar.....# foot 24¢25¢
W. M. & C. X Cuts, Thin Back.....# foot 27¢@29¢

Peace Circular and Mill..... 45¢10¢
Peace Hand Panel and Rip.....20¢@10¢20¢10¢10¢
Peace Cross Cuts, Standard.....# foot 25¢
Peace Cross Cuts, Thin Back.....# foot 27¢@28¢

Richardson's Circular and Mill
45¢@45¢10¢

Richardson's X Cuts,
No. 1, 30¢; No. 2, 27¢; No. 3, 24¢

Hack Saws—
Griffin's, complete.....40¢@10¢50¢
Griffin's Hack Saw, Blades.....40¢@10¢50¢
Star Hack Saws and Blades.....25¢
Diamond Hack Saws and Blades.....25¢
Eureka and Crescent.....25¢

Saw Frames—
White Vermont.....# gro \$9.00@10.00
Red, Polished and Varished.....# doz
\$1.50, 25¢

Saw Sets—
Stillman's Genuine.....# doz \$5.00@7.75,
40¢5¢
Stillman's Imita.....# doz \$3.25@5.25,
40¢5¢@40¢10¢
Common Lever.....# doz \$2.00, 40¢5¢
Morrill's No. 1, \$15.00; Nos. 3, 4, \$24.00,
10¢@10¢50¢

Leach's..... No. 1, \$8.00; No. 1, \$13, 15¢@20¢
Nash's.....20¢@10¢20¢10¢10¢
Hammer, Hotchkiss.....\$5.50, 10¢
Hammer, Bemis & Call Co.'s new Pat.....30¢5¢

**Bemis & Call Co.'s Lever and Spring
Hammer.....** 30¢5¢
Bemis & Call Co.'s Plate.....10¢
Bemis & Call Co.'s Cross Cut.....12½¢
Alken's Genuine.....\$13.00, 50¢10¢
Alken's Imitation.....\$7.00, 55¢5¢
Hart's Pat. Lever.....20¢
Dillon's Star, \$9, No. 15, \$5.50, 20¢

Atkin's Lever, # doz No. 1, \$6.00; No. 2,
\$6.50

Atkin's Criterion..... # doz \$7.50
Croissant (Keller), No. 1, \$15.00; No. 2,
\$24.00.....40¢
Avery's Saw Set and Punch.....50¢
Am. Tool Co.'s Superior.....# doz \$15.50¢

Saw Tools—
Atkins' Perfection.....# doz \$15.00
Atkins' Excelsior.....# doz \$6.00
Atkins' Giant.....# doz \$4.00

Scales—
Hatch, Counter, No. 171, good quality,
doz \$21.00
Hatch, Tea, No. 161.....# doz \$6.75@7.00
Union Platform, Plain.....\$2.10@2.20
Union Platform, Striped.....\$2.20@2.30
Chattillon's Grocers' Trip Scales.....50¢
Chattillon's Europe.....25¢
Chattillon's Favorite.....40¢
Family, Turnbills.....30¢@30¢10¢
Rieble Bros' Platform.....40¢

Scale Beams—
Scale Beams, List Jan. 12, '82.....50¢@10¢
50¢@10¢5¢
Chattillon's No. 1.....50¢@10¢5¢
Chattillon's No. 2.....50¢

Scrapers—
Adjustable Box Scraper (S. R. & L. Co.)
\$6.50.....30¢@10¢
Box, 1 Handle.....# doz \$4.00, 10¢
Box, 2 Handle.....# doz \$6.00, 10¢
Defiance Box and Ship.....20¢10¢
Foot.....50¢@10¢60¢
Ship, Common.....# doz \$3.50 net
Ship, R. I. Tool Co.....10¢

**Screen Window and Door
Frames—**
Porter's Pat. Window and Door Frame.....33½¢@104
Warner's Screen Corner Irons.....33½¢
33½¢@104
Stearns' Frames and Corners, 25¢@25¢10¢

Screw Drivers—
Douglas Mfg. Co.....30¢@10¢10¢
Disston's.....45¢@10¢
Disston's Pat. Excelsior.....45¢@10¢
Lug Bros.....30¢
Stanley R. & L. Co.'s
Varished Handles.....65¢10¢
Black Handles.....60¢@10¢
Sargent & Co.'s
No. 1 Forged Blade.....60¢@10¢10¢
Nos. 20, 30 and 60.....60¢@10¢10¢
Knapp & Cowles' No. 1.....60¢@20¢70¢
No

Machine-
Flat Head, Iron.....55c
Round Head, Iron.....60c
Bench and Hand.....
Bench, Iron.....55c
Bench, Wood, Beech.....75c
Bench, Wood, Hickory.....75c
Lag, Blunt Point, list Jan. 1, 1890.....75c
Conch and Lag, Gimlet Point, list Jan. 1, 1890.....75c
Bed.....25c
Hand Rail, Sargent's.....60c
Hand Rail, R. & B. Mfg. Co.....70c
Hand Rail, Am. Screw Co.....75c
Jack Screws, Millers Falls list.....50c
Jack Screws, P. S. & W.....35c
Jack Screws, Sargent.....60c
Jack Screws Stearns.....40c

Scroll Saws-
Lester, complete, \$10.00.....25c
Rogers, complete, \$4.00.....25c
Builders' and Cabinet Makers'.....15c
Barnes' Scroll Saw, Blum.....35c
Seythe Snaths.....50c

Shears-
American (Cast) Iron.....75c
Pruning, See Pruning Hooks and Shears.
Bernard's Lamp Trimmers.....\$ doz \$3.75
Tinners'.....20c
Seymour's, List Dec. 1881.....60c
Heinrich's, List Dec. 1881.....60c
Heinrich's Tailor's Shears.....35c
First quality C. S. Trimmers.....80c
Second quality C. S. Trimmers.....80c

**Acme Cast Shears.....10c
Diamond Cast Shears.....10c
Clippers.....10c
Victor Cast Shears.....75c
Howe Bros. & Hulbert, Solid Forged Steel.....40c
Chicago Drop Forge & F. Co., Solid Steel Forged.....60c
Clausen & Co., Japaned.....70c
Clausen Shear Co. Nickeled, same list, 60c Electric.....List net**

Sheaves-
Sliding Door.....
M. W. Co., list July, 1888.....50c
R. & E. list Dec. 18, 1885.....55c
Corbin's list.....60c
Patent Roller, Haidich.....75c
Russell's Anti-Friction, list Dec. 18, 1885.....60c
Moore's Anti-Friction.....50c

Sliding Shutter-
R. & E. list Dec. 18, 1885.....60c
Reading list.....60c

Ship Tools-
L. & J. White.....20c
Albertson Mfg. Co.....25c

Sheets, Horse, Mule, &c.-
Horse.....
Burden's, Perkins', Phoenix, at factory.....\$4.00

Mule-
Add 1¢ per kg to above prices.
Or, Wrought-
Ton lots.....\$ 9¢
1000 lb lots.....\$ 9¢
100 lb lots.....\$ 1¢

Shot-
Eastern prices 2¢ off, cash, 5 days.
Drop, 7 bag, 25 lb.....\$1.19
Drop, 7 bag, 5 lb......29
Buck and Chilled, 7 25-lb bag.....1.44
Buck and Chilled, 7 5-lb bag......34

Shovels and Spades-
Ames Shovels, Spades, &c., list Nov. 1, 1885.....20c
NOTE-Jobbers frequently give 5¢ per doz extra

**Griffith's Black Iron.....50c
Griffith's C. S.....60c
Griffith's Solid C. S. R. Goods.....20c
Old Colony (Sanford Fork & Tool Co.) 35c
St. Louis Shovel Co.....15c
Hussey, Binns & Co.....15c
Wheeler & Co.....15c
Lehigh Mfg. Co.....50c
Payne Pettibone & Son, list January, 1886.....30c
Remington's (Lowman's) Pat. 50c
Rowland's, Black Iron.....50c
Bowland's Steel.....60c**

Shovels and Tongs-
Iron Head.....60c
Brass Head.....60c

Skins, Thimble-
Western list.....75c
Columbus Wrt. Steel, list Jan. 3, 1889.....

**Coldbrookdale Iron Co.....50c
Utica P. S. T. Skins.....60c
Utica Turned and Fitted.....35c**

Sieves-
Mann's Tin Rim.....50c
Buffalo Metallic, S. S. & Co.....50c
Shaker (Barier's) Pat. 50c

Electric-
A. & W. Sifters.....\$ gr \$21.00
A. & W. Sifters.....\$ doz \$2.00
Hunter's.....\$ doz \$2.00
Smith's Adjustable Sifters.....\$ doz \$2.00
Smith's Adjustable Milk Strainer.....\$ doz \$1.25

Smith's Adjustable T. & C. Strainer.....\$ doz \$1.25

Stoves, Wooden Rim-
Mesh 18, Nested, \$ doz.....80¢
Mesh 20, Nested, \$ doz.....95¢
Mesh 24, Nested, \$ doz.....\$1.16

Staples-
School, by case.....60c

Staples, Harness, &c.-
Anchor (T. & S. Mfg. Co.).....65¢
Fitch's (Bristol).....50c
Hotchkiss.....10c
Andrews.....10c
Sargent's Patent Guarded.....70c
German, new list.....40c
Covert.....50c
Covert, New Patent.....50c
Covert, N. E.....60c
Smith's Spring.....60c

Soldering Irons-
Soldering Coppers.....\$ 22¢
Covert's Adjustable, list Jan. 1, 1882.....25c

Spit Toons, Cuspidors, &c.-
Standard Fibreware.....\$ doz No. 5, 88;
No. 8, 89;
Spittoons, Daisy, 8-inch, No. 1, \$4; 10 and 11 inch, \$6.

Spoke Shaves-
Iron.....45c
Wood.....50c
Bayer (Stanley R. & L. Co.).....50c
Stearns.....20c
Cincinnati.....25c

Spoke Trimmers-
Bonney's.....\$ doz \$10.00, 50¢
Stearns'.....20c
Ives, No. 1, \$15.00; No. 2, \$12.00 per doz.....20c
Douglas'.....\$ doz \$9.00, 20¢
Cincinnati.....25c

Spoons and Forks-
Tinned Iron.....70c
Basting, Cen. Stamp. Co.'s list.....70c
Solid Table and Tea, Cen. Stamp. Co.'s list.....70c
Buffalo & Son.....35c

Silver-Plated-(4 mos. or 5¢ cash 30 days)-
Meriden Brit. Co., Rogers.....40, 15, 10, 5c
C. Rogers & Bros.....40, 15, 10, 5c
Rogers & Barton.....40, 15, 10, 5c
Wm. Rogers Mfg. Co.....40, 15, 10, 5c
Simpson, Hall, Miller & Co., 40, 15, 10, 5c
Holmes & Edwards Silver Co.....40, 15, 10, 5c
L. Boardman & Son.....40, 15, 10, 5c

Miscellaneous-
Holmes & Edwards Silver Co.:
No. 67 Mexican Silver.....50c
No. 30 Silver Metal.....50c
No. 24 German Silver.....50c
No. 50 Nickel Silver.....50c
No. 49 Nickel Silver.....50c
German Silver.....50c
German Silver, Ball & Co.....50c
Nickel Silver.....50c
Britannia.....60c
Boardman's Nickel Silver.....50c
Boardman's Britannia Spoons, case lots.....60c

Springs-
Elliptic, Concord, Platform and Half Scroll.....60c
Cliff's Bolster Springs.....25c

Squares-
Steel and Iron.....75c
Nickel-Plated.....\$ fulcrs, ex. 10¢
Try Square and T Bevels.....\$1.05
Dialton's Try Square and T Bevels.....45c
Winterbottom's Try and Miter.....30c
Starrett's Micrometer Caliper Squares.....25c
Avery's Flush Bevel Squares.....40c
Avery's Bevel Protractor.....50c

Standard Fibre Ware-
Per Dozen.
Wash-Basins, 10 1/2 in.....\$3.00
Wash-Basins, 12 in.....2.25
Keelers, 11 1/4 in.....4.00
Cuspidors.....8.00
Spittoons, "Daisy," 8 in.....4.00
Pock Measure.....4.00
Half-peck Measure.....3.50
See also to Falls.

Staples-
Fence Staples, Galvanized.....Same price
Fence Staples, Plain.....See Trl. Rep.

Steelyards.....40c to 100c

Stocks and Dies-
Blacksmith's.....30c
Waterford Goods.....30c
Butterfield's Goods.....30c
Lightning Screw Plates.....25c
Reece's New-Screw Plates.....35c
Reversible Ratchet.....30c
Gardner.....25c

Stone-
Hindston No. 1, 3¢; Axe, 3 1/2¢; Slips No. 1, 4 1/2¢
Sand Stone.....2¢
Washita Stone, Extra.....19c
Washita Stone, No. 1.....14c
Washita Stone, No. 2.....10c
Washita Slips, No. 1, Extra.....35c
Washita Slips, No. 1.....24c
Arkansas Stone, No. 1, 4 to 6 in.....15c
Arkansas Stone, No. 1, 6 to 9 in.....18c
Turkey Stone, No. 1, 4 to 6 in.....40c
Turkey Slips.....\$1.00
Lake Superior, Chase.....18c
La Superior Slips, Chase.....18c
Seneca Stone, Red Paper Brand.....18c

**Seneca Stone, High Rounds.....20c
Seneca Stone, Small Whets.....25c**

Steve Polish-
Joseph Dixon's.....\$ gro \$6.00, 10c
Gem.....\$ gro \$4.50, 10c
Gold Medial.....\$ gro \$6.00, 25c
Mirror.....\$ pro \$6.00, -4
Lustro.....\$ gro \$4.75
Rising Sun.....\$ gro \$5.00
Dixon's Plumbago.....\$ 50c
Bornton's Noon Day.....\$ 13.00
Parlor Pride Stove Enamel.....\$ 30c
Yates' Liquid, 2 3 1/2 10 gal.....\$ 8¢
Yates Standard Paste Polish, 10-lb cans.....\$ 15¢
Jet Black.....\$ gro \$3.50
Japanese.....\$ gro \$3.50
Firesteel.....\$ gro \$2.50
Diamond O. K. Enamel.....\$ gro \$19.00
Bonnell's Liquid Stove Polish.....\$ gro \$9.00
Bonnell's Iron Stove Polish.....\$ gro \$6.00
Black Eagle Benzine Paste, 5 and 10 lb cans.....12¢
Black Jack Water Paste, 5 and 10 lb cans.....12¢
Nickel Plate Paste.....\$ gro \$6.00

Tacks, Brads, &c.-
List Oct. 10, 1889, extra 10c 1/2 cash.
Capit Tacks.....
American Iron, Blued.....70c
American Iron, Tinned or Cop'd.....70c
Steel, Plain or Bright.....70c
Steel, Tinned or Coppered.....70c
Swedes Iron, Blued.....70c
Swedes Iron, Tinned or Cop'd.....70c
American Iron Cut Tacks.....67c
Swedes Iron Upholster's Tacks, S. S., 70c
Swedes Iron Upholster's Tacks, Tinned, S. S.....70c
Swedes Iron Card and Upholsterers' Tacks, Lanc.....60c
Swedes Iron Card and Upholsterers' Tacks, Tinned, Lanc.....60c
Gimp and Lace Tacks Lanc, Swedes Iron.....60c

Gimp and Lace Tacks, Lanc, Swedes Iron.....60c

Gimp and Lace Tacks, S. S., 70c

Swedes Iron Basket or Trimmers' Tacks, Lanc.....60c

Bill-Posters or Railroad Tacks, S. S., 70c

Copper Tacks.....50c

Copper Finish, & Trunk Nails.....50c

Clair Box Nails.....50c

Zinc Glaziers' Points.....50c

Picture Frame Points.....50c

Looking-Glass Tacks.....50c

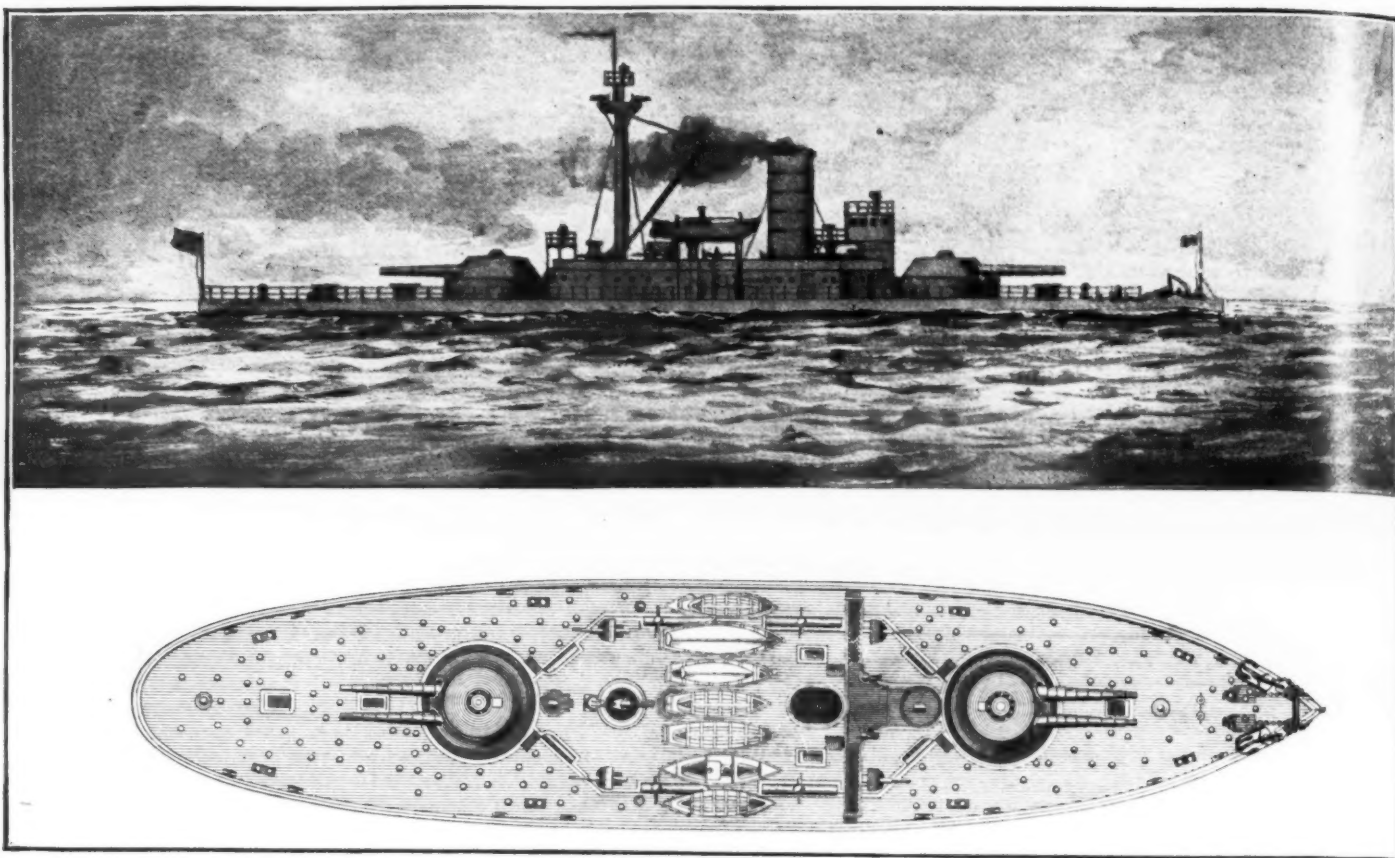
Brush Tacks.....50c

Tin-Capped Trunk Nails.....60c

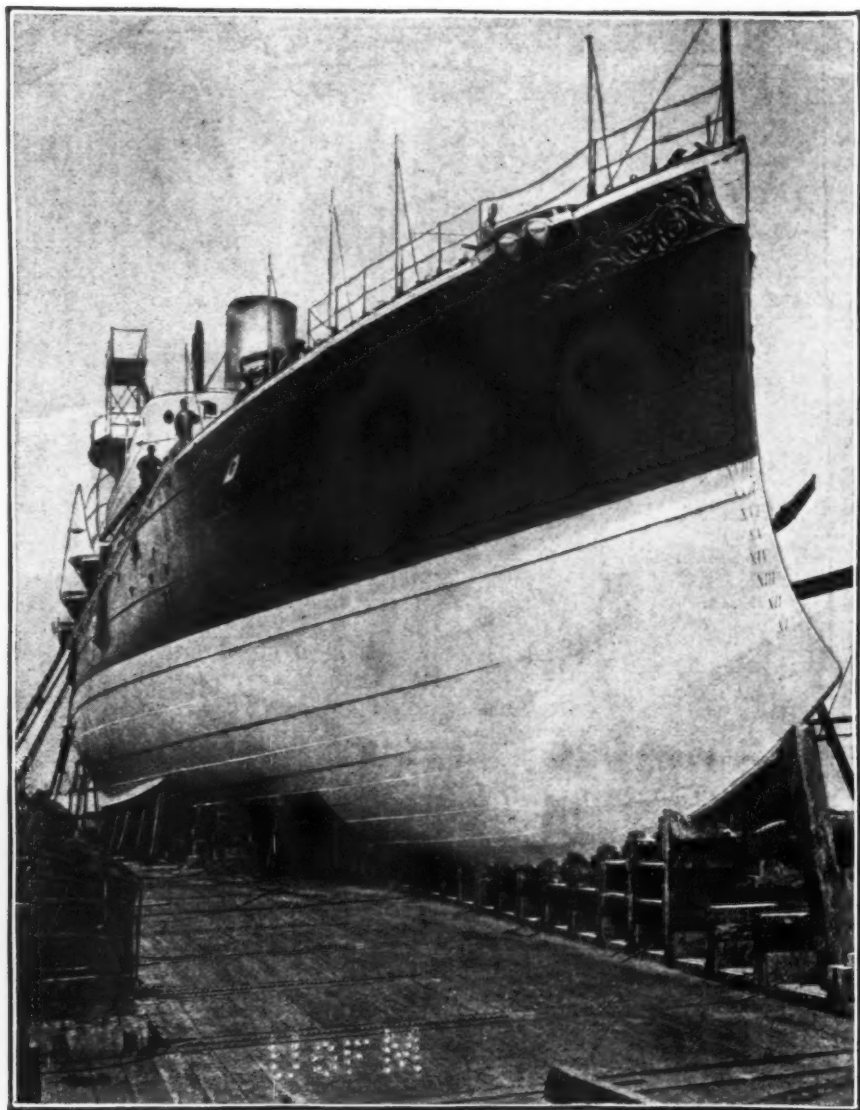
Finishing Nails.....65c

Trunk & Clout Nails, Black & Tin'd.....60c

1901



U. S. S. PURITAN.

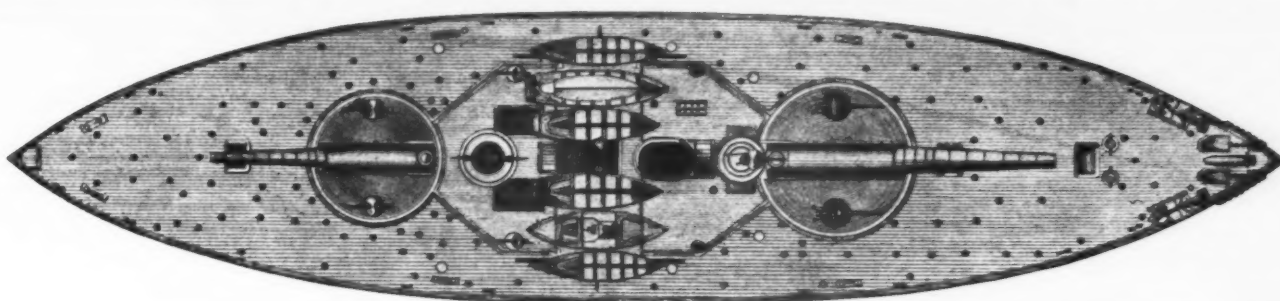
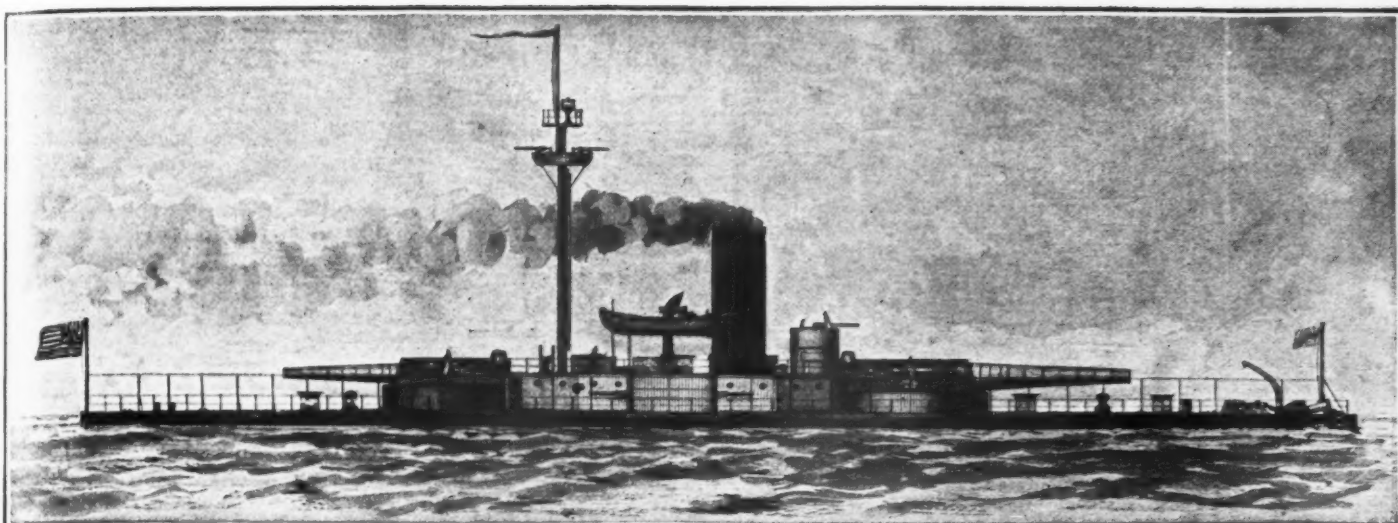


U. S. S. CHARLESTON, IN DOCK AT UNION IRON WORKS, SAN FRANCISCO, CAL., 1889.

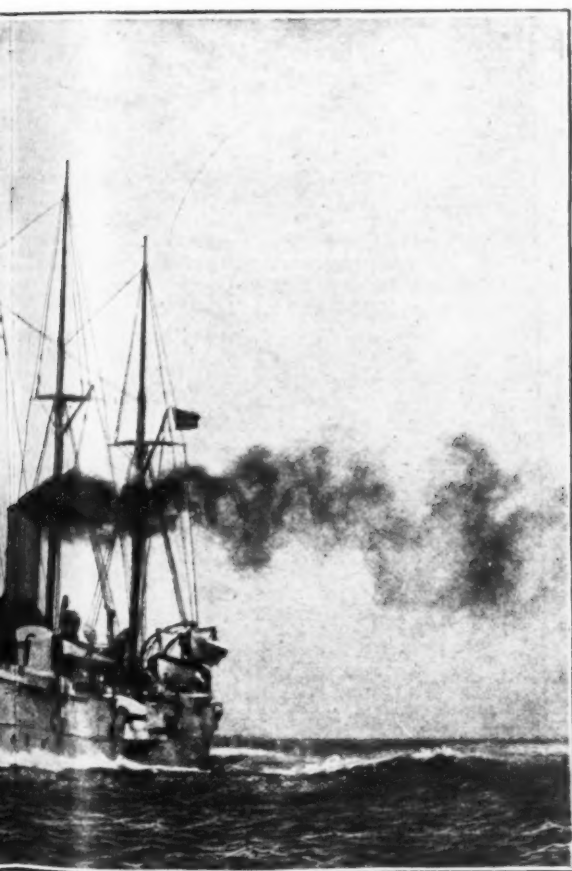


U. S. S.

U. S. S. MEADE.

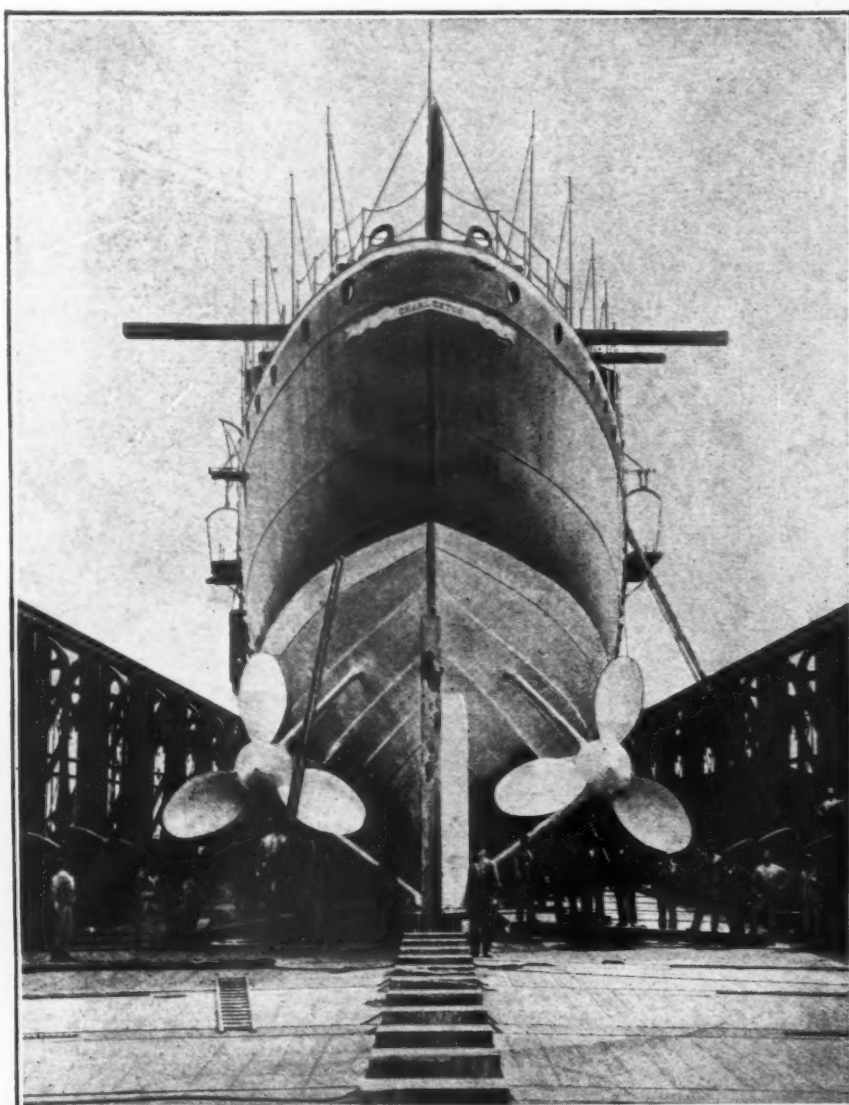


U. S. S. COAST DEFENSE VESSEL.



U. S. S. YORKTOWN.

OF WAR.



U. S. S. CHARLESTON, IN DOCK AT UNION IRON WORKS, SAN FRANCISCO, CAL., 1889.